

## National Strawberry Tour Coming to Western PA

Join the North American Strawberry Growers Association (NASGA) for their 2019 Summer Tour as they visit farms in Western Pennsylvania. The tour on August 20 and 21 will be headquartered at the Drury Inn & Suites Pittsburgh Airport Settlers Ridge. They will visit NASGA (and PVGA) members and see a variety of production systems, on-farm value-added activities and some excellent farm markets.

Tour stops include: Sand Hill Berries and Greendance Winery in Mount Pleasant, Soergel Orchards in Wexford, Janoski's Farm and Greenhouse in Clinton, Shenot Farm and Market in Wexford, Kaelin Farms in Wexford, and Harvest Valley Farms in Valencia.

For more information visit [www.nasga.org](http://www.nasga.org), or call Kevin Schooley at 905-735-5379.

*This year's strawberry harvest at Harvest Valley Farms, Valencia. Photo by Harvest Valley Farms.*



## PVGA Loses Life Member Jack Grace



Jonathan "Jack" Grace, a PVGA Life Member, passed away on May 17 at the age of 82 after a five-year battle with cancer. A native and life-long resident of Grove City, he and his family operated Graceland Farm Market in Grove City offering fresh fruits and vegetables as well as greenhouse ornamentals. The

Market also includes a section of decorative glassware. For about 25 years or so, Jack along with his daughters Nancy and Jackie, have helped at the PVGA Farm Show food booth - including 22 years where they volunteered for the entire week of the Farm Show to manage the soup section of the booth. This past year was the first year Jack was not able to help because

of his health. His cancer treatments the past several years limited his energy but he persevered in not only continuing to help at the Farm Show but also doing as much farm and greenhouse work as possible.

Jack was born on his family farm and was a fifth-generation farmer. He was active in 4-H and started to develop his own farming projects including raising hogs for his high school FFA chapter, of which he was a charter member. He earned the prized FFA Keystone Degree. Three of his children also earned the Keystone Degree and he and his wife were awarded the Honorary Keystone Degree.

He began working at the Eastern States store in Grove City a month after he and his wife Dottie were married in 1957. His next job was at Cooper Bessemer from 1965 to 1968 as a tool grinder, with a short time on the erection floor. He then bought his brothers dairy herd and until 1972 milked with the "help" of his young kids.

While farming was always his first choice of occupation; with a wife and six children to feed and clothe he spent many

*(continued on page 2)*

## NEWS



**Pennsylvania  
Vegetable Growers  
Association**

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

*President*

**Jonathan Strite '22**

*Harrisburg*

*First Vice President*

**Brian Campbell '21**

*Berwick*

*Second Vice President*

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**Tina Forry '22**

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**Christopher Harner '20**

*State College*

**Barron Hetherington '22**

*Ringtown*

**Alan Kemmerer '22**

*Berwick*

**Arthur King '21**

*Valencia*

**Kenneth Martin '20**

*New Berlin*

**Amy Metrick '21**

*Butler*

**Michael Orzolek '21**

*State College*

**Christopher Powell '20**

*Strasburg*

**John Shenk '20**

*Lititz*

**Robert Shenot '22**

*Wexford*

**Jeffrey Stoltzfus '20**

*Atglen*

**Mark Troyer '21**

*Waterford*

**Executive Secretary**

**William Troxell**

*Richfield*

**PVGA Loses...** (continued from page 1)

years sharing his time on the farm with working at other jobs. In 1972 he was hired as a mechanic and occasional driver for Grove City Bus Lines, a job that took him all over the country keeping the buses running and occasionally limping a "crippled bus" home. Working at the bus lines gave him the opportunity to drive the bus hauling the local FFA & FHA chapters to the Pennsylvania Farm Show during the years his children were members and several years beyond.

In the 1880's a section of the farm was deeded over to form a community cemetery. Jack has held the role of Vice-President of the cemetery association since his father died in 1987. His father became responsible for the grave openings and burials in 1942 and Jack along with children and grandchildren continued this service.

In 1962 he had helped his parents build a small roadside stand on the farm and then he and his growing family helped in getting vegetables grown and harvested and also hauling fruit from orchards up along Lake Erie. As the years progressed and his parents aged he took on more of the responsibility of day to day operations. The original stand came down in a storm in the early 80's and was replaced with a larger market over the next few years.

While attending Vegetable Field Day at Rock Springs in the late 80's he joined the Pennsylvania Vegetable Growers Association which led to attending growers meetings in his local area of the state and then the annual Vegetable Conference (as it was then called) in Hershey. He heard of the need for volunteers at the PVGA Food Booth at the Farm Show so he and his daughter Jackie volunteered for a shift each. As noted above for 22 some years he and his daughters Jackie and Nancy spend the entire week each year making from hundreds of gallons of soup to serve up to the Farm Show crowds.

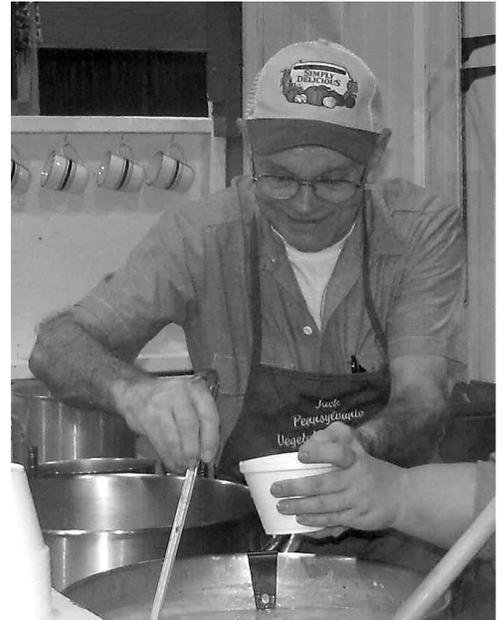
At one point Jack decided to raise his own vegetable transplants and the front porch of the house became a makeshift greenhouse. As neighbors saw what he was doing, requests started pouring in for him to grow some for them too. That small porch operation has evolved into four greenhouses supplying the community with spring bedding plants, patio pots and hanging baskets as well as hardy mums and perennials in the fall.

The operation has grown from that small 8 'x 12' roadside stand to a farm market that supplies seasonal fresh fruits and vegetables to the community, a greenhouse operation, and a gift shop with glass gifts and collectibles made in West Virginia, Ohio and Pennsylvania as well as and other hand-made items. Although most of those six kids have moved on to other professions, they still gather to get things planted in the spring and for that last push to get harvested before the first killing frost hits in the late fall.

He was member of Millbrook Presbyterian Church. Most important in Jack's life were God, family and farming. He is one of the few PVGA members honored by the Board of Directors with a Life Membership who not either a member of the Board of Directors or a Penn State researcher or Extension staff member.

Survivors include his wife, Dottie, at home; six children, Dawn Grace and partner Wayne Jaillet, Frank Grace and wife Bonnie, Jackie Grace, Bill Grace, Nancy Grace and Mark Grace and wife Dawn; eight grandchildren; nine great-grandchildren; a sister, Nancy McCauslin; and a brother, James D. Grace and wife Ida.

Memorials may be made to the American Cancer Society.



*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](mailto:pvga@pvga.org) website - [www.pvga.org](http://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.*

## National News Briefs

### Important Notice for ALL Farm Employers

Immigration and Customs Enforcement (ICE) has increased employer inspections of Form I-9 records. Every employer must take this matter seriously.

Under the Immigration Reform and Control Act ("IRCA") of 1986, all U.S. employers are required to verify that individuals they hire are authorized to work in the United States, including citizens and noncitizens. The Form I-9 is used for verifying the identity and employment authorization, and employers must ensure proper completion of Form I-9 for everyone they have hired after November 6, 1986.

ICE initiates the Form I-9 inspection process by serving a Notice of Inspection (NOI), either as an in-person visit or via Certified Mail, compelling the production of Forms I-9, and, sometimes, supporting documentation that may include a copy of the payroll, list of the current employees, articles of incorporation, and business licenses. The law provides employers with at least three business days to produce the Forms I-9, and ICE agents or auditors will then conduct an inspection of the Forms I-9 for compliance.

Once the inspection is completed, ICE will notify the audited party of the results in writing.

Employers who are found to violate the verification and employment eligibility requirements may be subject to criminal and civil sanctions, with fines of several thousand dollars for each Form I-9 that is missing, improperly filled-out, or ignoring a Notice of Inspection (NOI) from ICE.

If you are served a NOI, it is recommended that you comply with the request within THREE DAYS, and seek guidance from an experienced employment or immigration attorney.

*From the **Pennsylvania Agricultural Alliance Issues Update**, Penna. Farm Bureau, May 2019.*

### Certification Cost Share Funding Available Now

The USDA Farm Service Agency (FSA) recently announced that organic producers and handlers can apply for federal funds to assist with the cost of receiving and maintaining organic certification through the [Organic Certification Cost Share Program \(OCCSP\)](#).

Deadline for this round of applications: Oct. 31, 2019.

Certified producers and handlers are eligible to receive reimbursement for up to 75 percent of certification costs each year, up to a maximum of \$750 per certification scope, including crops, livestock, wild crops, handling and state organic program fees.

### Disaster Aid Bill Advances in Congress

The U.S. House voted 257-150 to approve a Farm Bureau-supported disaster-relief package that aims to help farmers and rural communities recover from catastrophic weather events in 2018 and 2019. The \$17.2 billion proposal would provide an extra \$3 billion in farm disaster assistance for USDA to help farmers offset crop losses. Other highlights include \$150 million in grants to develop essential community facilities in rural areas, \$500 million in conservation funding to help farmers rehabilitate farmland after natural disasters and \$310 million for emergency watershed work. The bill now goes to the Senate for consideration. Pennsylvania farmers could potentially see some benefits from the package, as 2018's heavy rain and flooding was declared a disaster throughout most of the state. However, it will be up to USDA to determine how funding is distributed if the bill

is adopted. The following members of Pennsylvania's congressional delegation voted to support the bill: Reps. Brian Fitzpatrick, Brendan Boyle, Dwight Evans, Madeleine Dean, Mary Gay Scanlon, Chrissy Houlahan, Susan Wild, Conor Lamb, and Michael Doyle.

*From **Farm Bureau Express**, Penna. Farm Bureau, May 17, 2019.*

### Agriculture Women Encouraged to Respond to Survey

The American Farm Bureau Women's Leadership Program is hoping to gauge the goals, aspirations, achievements and needs of women in agriculture through an online survey.

The survey is open to women in all areas of agriculture, as long as they live in the United States. You do not have to be a Farm Bureau member to respond. Data collected will be used to gauge trends related to women in agriculture and will update a similar survey that was conducted in 2014.

Participants will be entered for a chance to win one of five \$100 gift cards after the survey closes on June 21. To respond to the survey, please visit [fb.org/women](http://fb.org/women).

*From the **Pennsylvania Agricultural Alliance Issues Update**, Penna. Farm Bureau, May 2019.*

### New Chinese Tariffs Disrupt Agriculture Markets, More Aid Proposed

Farmers are again in the crosshairs as the trade war between the U.S. and China, one of the nation's top agricultural trade partners, continues to escalate. President Donald Trump recently hiked tariffs on \$200 billion in Chinese goods, prompting China to retaliate with increased tariffs on \$60 billion in U.S. exports, including some agricultural products, which are scheduled to take effect June 1. The news roiled commodity markets putting further financial stress on farmers who are already contending with low prices as a result of retaliatory tariffs imposed by China and other nations last year. Trump has signaled that his administration would seek to offer \$15 billion in assistance to farmers to help offset the damage caused by the tariffs; however, details have not yet been announced. The administration previously implemented a \$12 billion aid package to help mitigate last year's retaliatory tariffs. In a letter to Trump, American Farm Bureau President Zippy Duvall highlighted the financial damage tariffs have inflicted on farmers, noting that U.S. agricultural exports to China were slashed by \$10 million (about a 50 percent loss) as a result of the 2018 tariffs. "We ask that your trade negotiators make a deal as soon as possible to end the tariffs that are slashing our exports, destroying a once promising market for agriculture, worsening the farm economy, and contributing to high levels of stress and uncertainty for many farm and ranch families and other Americans whose jobs are connected to agricultural production," Duvall wrote.

*From **Farm Bureau Express**, Penna. Farm Bureau, May 17, 2019.*

### Advocates Call for Commonsense Clean Water Rule

Farmers want to comply with federal laws and regulations protecting water quality; but to do so, they need understandable rules that clearly spell out their obligations, Pennsylvania Farm Bureau told regulatory agencies recently.

*(continued on page 4)*

## NEWS

## State News Briefs

### Bill Easing Regulatory Burden on Wedding Barns Moves Forward

A bill that aims to ease the regulatory burden on agricultural buildings used occasionally for weddings and other social events has cleared its first hurdle in the General Assembly.

The Senate Labor and Industry Committee voted 6 to 3 to send Senate Bill 453, which is supported by Pennsylvania Farm Bureau, to the full chamber for consideration.

The measure, sponsored by Sen. Judy Ward of Blair County, would exempt wedding barns and similar structures from certain requirements imposed under the uniform commercial code, provided that the building still meets other standards to ensure a high level of safety. The exemption would apply to buildings first constructed prior to 1999, not new construction.

Pennsylvania Farm Bureau supports the measure and believes that the exemption is necessary to ensure farmers are able to take advantage of the opportunities that come with hosting events on the farm without being stymied by cost-prohibitive requirements intended for commercial buildings. Instead, safety would be ensured through steps that are more practical to implement in agricultural buildings.

*From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, May 2019.*

### Bill Clarifying Agritourism on Preserved Farmland Clears Senate

State senators voted 47-0 to advance a Pennsylvania Farm Bureau-supported bill that seeks to add more certainty for farm-

### National News... (continued from page 3)

The comments came in support of the U.S. Environmental Protection Agency's and U.S. Army Corps of Engineers' proposed clean water rule, which aims to clarify which bodies of water are subject to federal regulation. The proposed rule would replace the controversial 2015 Waters of the U.S. rule (or WOTUS), which Farm Bureau opposed.

PFB commended the agencies for drafting a rule that offers a clearer definition of federally regulated waters than WOTUS and said the proposal demonstrates that the agencies recognize the federal Clean Water Act "is not a license for the federal government to regulate every water body in the United States." PFB also recommended several improvements to the proposed rule, identifying several areas where definitions could be more precise and noting the importance to farmers of understanding what areas of their farm are subject to federal—versus state or local—regulation.

"PFB believes that the revised definition of 'waters of the United States' should include clear terms that are easy to apply in the field," the organization wrote. "Farmers cannot overstate the importance of a rule that draws clear lines of jurisdiction that can be understood without the need to hire an army of consultants and lawyers."

Farm Bureau was a leading critic of the 2015 WOTUS rule, which it argued was too broad, lacked clarity and attempted to regulate land well beyond what is allowed under federal law. The rule would have imposed hefty new costs and burdens on farmers making even minor land-use decisions. The new proposal more clearly defines what bodies of water are subject to federal regulation and which are left up to state governments to regulate.

ers who are looking to supplement their income by establishing agritourism operations on preserved farms. Senate Bill 583 now goes to the House for consideration. The legislation, sponsored by Sen. Ryan Aument of Lancaster County, would establish a uniform definition of agritourism and clarify that such activities are permissible on preserved farms. Currently, county farmland preservation boards may approve incidental businesses, including agritourism, on preserved farms. However, the definition of what constitutes agritourism can vary between counties. The bill would maintain county boards' roles in approving agritourism on preserved farms but establish common definitions that landowners and farmland preservation boards can rely on to make decisions. A similar bill was passed by the Senate last year but was not taken up by the House.

*From Farm Bureau Express, Penna. Farm Bureau, May 17, 2019.*

### Senate Passes Beginning Farmer Bill

A proposal that aims to help the next generation of Pennsylvania farmers get established, one of Pennsylvania Farm Bureau's key legislative priorities this year, has been passed by the state Senate. Senators voted 47-0 in favor of Senate Bill 478, sending it to the House for consideration. PFB worked with state Sen. Elder Vogel of Beaver County to introduce the legislation, which would establish an income tax credit for landowners who lease or sell land, buildings and/or equipment to beginning farmers. The bill would allow for a one-time tax credit for property sold to a beginning farmer or a multi-year credit for property leased. The tax credit could be used to aid in family transitions—such as sales from a parent or grandparent to a child or grandchild—or to help an unrelated beginning farmer. The bill outlines criteria defining who is a beginning farmer, excluding individuals who have been engaged in farming for more than 10 years. For every four farmers in Pennsylvania that are age 65 or older, there is only one farmer under the age of 35. PFB believes that helping young farmers pick up the reins and get established is critical to continuing Pennsylvania's agricultural legacy and the important contributions farming makes to our state's economy and way of life. And with no neighboring states offering such a program, PFB believes a tax incentive in Pennsylvania could make the state a regional leader in agriculture.

*From Farm Bureau Express, Penna. Farm Bureau, May 17, 2019.*

### Senators Approve Bill to Allow Wider Farm Equipment

Legislation supported by Pennsylvania Farm Bureau that would allow farmers to move wider equipment on roadways has cleared the state Senate. Senators voted 48-0 in favor of Senate Bill 338, sponsored by Rep. Wayne Langerholc of Cambria County, sending the bill to the House for consideration. The measure would allow farm equipment up to 18 feet wide to operate on roadways under certain safety restrictions. Currently, farmers can move equipment up to 16 feet wide on roadways within 50 miles of their farm. The bill would increase the maximum width allowed to 18 feet, while retaining the Vehicle Code's current safety requirements and restrictions for movement of larger farm equipment on roadways.

*From Farm Bureau Express, Penna. Farm Bureau, May 17, 2019.*

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**Moon Whisper F1  
Pumpkin**

- Powdery mildew resistant
- Fruit average 14 lbs.
- Large vine
- Flat, white fruit, excellent for stacking

## NEWS

**State News...** (continued from page 4)**Bill to Add Checks on Regulations Advances**

A bill that would enable the General Assembly to review and initiate a repeal of state regulations was recently advanced by the House Environmental Resources and Energy Committee.

The committee's 15 to 9 vote sends House Bill 430 to the full chamber for consideration.

The measure, sponsored by state Rep. Kerry Benninghoff of Centre County, would provide important checks and balances by allowing the General Assembly to initiate the process of repealing a regulation. The repeal would ultimately need to be approved by the House, Senate and governor.

In a message to lawmakers, Pennsylvania Farm Bureau wrote that farmers, like many small business owners, are concerned about the burden that duplicative and unnecessary regulations have on their operations and bottom line. PFB added that there are many important and necessary regulations but that the bill would facilitate an important function of government: determining which laws and regulations are still relevant.

*From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, May 2019.*

**House Passes Lyme Disease Treatment Bill**

A bill that would expand Lyme disease patients' access to treatment options has cleared the state House of Representatives.

The 158 to 34 vote sends House Bill 629 to the Senate for consideration. The bill, sponsored by Rep. Kathy Rapp of Warren County, would require health insurance companies to cover longer courses of treatment for Lyme disease and other tick-borne illnesses.

Once a diagnosis of Lyme disease is made, patients should be able to choose the treatment option that their health care professional believes will be most effective, Pennsylvania Farm Bureau wrote to lawmakers in support of the bill. Sometimes, that can mean a long-term regiment of antibiotics, which currently is not always covered by health insurance. Pennsylvania has the highest reported cases of Lyme disease in the nation and farmers are particularly at risk due to the amount of time they spend outside and near habitat favored by ticks.

*From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, May 2019.*

**Draft Plan to Improve Chesapeake Bay Water Quality Released**

Pennsylvania farmers and other members of the public can now get a first look at what measures the state is proposing for agriculture and other sectors to improve water quality in the Chesapeake Bay.

Pennsylvania Department of Environmental Protection recently released its draft Phase 3 Watershed Improvement Plan (or WIP), which details how the state plans to meet its federally mandated goals for reducing nitrogen and phosphorus in streams and rivers within the Chesapeake Bay Watershed by 2025. The bay watershed spans 43 Pennsylvania counties, covering most of the central part of the state.

The plan identifies specific goals for farms within the watershed to implement various conservation practices, such as nutrient management planning, soil health improvements, establishment of riparian buffers and manure management. In addition, the plan calls for additional funding and staff to help fund work towards those goals.

Several recommendations of the WIP Steering Committee's Agriculture Workgroup were included in the draft WIP, including measures to improve soil health and calls for more funding and technical support to help farmers implement conservation practices. To see a summary of the Agriculture Workgroup's recommendations, visit [www.pfb.com/PaWIP3Ag](http://www.pfb.com/PaWIP3Ag).

The full draft WIP can be viewed online at <http://bit.ly/2VZnoiV>. Please see pages 41 through 44 for discussion of goals related to agriculture and pages 97 through 113 for discussion of funding and technical support needs.

*From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, May 2019.*

**Agritourism Survey**

Agritourism operators or farmers who are considering starting an agritourism enterprise are encouraged to participate in a survey from Penn State Extension. The survey aims to examine whether agritourism can help Pennsylvania farms stay or become profitable. Responses are confidential and only statistical summaries, not individual responses, will be used in reports. To participate in the survey, go [https://pennstate.qualtrics.com/jfe/form/SV\\_a5YGUrYHvh7dSrX..](https://pennstate.qualtrics.com/jfe/form/SV_a5YGUrYHvh7dSrX..) For more information, contact Claudia Schmidt at **814.863.8633** or [cschmidt@psu.edu](mailto:cschmidt@psu.edu).

*From Farm Bureau Express, Penna. Farm Bureau, May 17, 2019.*

**Farmers Remind Drivers to Stay Safe on Rural Roads**

Farmers across Pennsylvania delivered an important message to drivers as they prepared to return to the fields for spring planting: Protect your safety and ours.

At events throughout the state during Rural Road Safety Week in mid-April, Pennsylvania Farm Bureau members stressed the importance of being alert for large farm equipment on rural roads and being patient to ensure safety.

PFB organized a statewide new conference at Stamy Farms in Cumberland County in conjunction with PennDOT, State Police and the Pennsylvania Department of Agriculture. Many county Farm Bureaus also held their own events with local officials in their areas.

"Although we are promoting Rural Roads Safety Week, we hope motorists will drive defensively throughout the entire planting, growing and harvesting seasons," said PFB President Rick Ebert. "We are also encouraging farmers to double-check safety devices, signage and lighting on their vehicles to ensure they are visible and meeting all transportation standards. Frankly, we believe accidents can be prevented if farmers and motorists look out for one another. When all motorists drive smart, share the road and follow basic safe driving tips, we can prevent accidents and save lives."

According to preliminary PennDOT crash data, there were eight fatalities from crashes involving farm equipment in 2018, while 693 people were killed in non-farm related crashes on rural roads in 2018. Farmers are legally allowed to operate farm equipment on Pennsylvania roads and they must display the Slow Moving Vehicle (SMV) Emblem (an orange colored triangle with a red border) on the rear of all vehicles or equipment that consistently travel at speeds of 25 mph or less.

*(continued on page 8)*



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## NEWS

**State News...** (continued from page 6)

PFB created a brochure with background information and tips for motorists and farmers as part of Rural Roads Safety Week. The brochure can be viewed or downloaded at: [www.pfb.com/images/brochures/current-RRS-bro.pdf](http://www.pfb.com/images/brochures/current-RRS-bro.pdf).

From the **Pennsylvania Agricultural Alliance Issues Update**, Penna. Farm Bureau, May 2019.

**Soil Compaction a Concern This Spring**

Soils having a moisture content of 21 percent or greater will exhibit a gummy or plastic state and may, in some instances, approach a liquid consistency. Soil compaction is easier to avoid than to have to remediate later.

To prevent soil compaction, check a soil sample to determine if it can be rolled into a ball. If so, this is the plastic state, which is easily compacted. Fields that are muddy should be left to dry. The surface may be dry but underneath the soil may remain very wet. Field traffic from spreading manure, liming, etc. should be limited using floatation tires that are not overinflated. Weight per axle should be limited to 10 tons. Increasing soil organic matter will help it to resist soil compaction and help soils recover from its effects rapidly.

From the **Pennsylvania Agricultural Alliance Issues Update**, Penna. Farm Bureau, May 2019.

**Remember to Apply for Leopold Conservation Award**

Pennsylvania farmers who have gone above and beyond in caring for natural resources are encouraged to apply for the

prestigious Leopold Conservation Award. The nomination period for the 2019 award is open now through **Aug. 1**.

Given in honor of renowned conservationist Aldo Leopold, the \$10,000 award recognizes landowners who inspire others with their dedication to land, water and wildlife habitat management on private, working land.

Sand County Foundation, the nation's leading voice for conservation of private land, presents the award to private landowners in 13 states. This is the second year the award has been offered in Pennsylvania, where it is presented in partnership with Pennsylvania Farm Bureau and Heinz Endowments.

"We are excited about the opportunity to once again encourage farmers to participate in the Leopold Conservation Award application process after a successful inaugural effort in 2018," PFB President Rick Ebert said. "We are proud of the thousands of farmers across the state who have demonstrated a strong commitment to enhancing the environment through conservation and best management practices that improve soil health and water quality, while reducing erosion."

Nominations for the 2019 award—which will be presented at the 2020 Pennsylvania Farm Show—may be submitted on behalf of a landowner, or landowners may nominate themselves. The application can be found at: <https://sandcountyfoundation.org/uploads/PA-2019-CFN.pdf>.

From the **Pennsylvania Agricultural Alliance Issues Update**, Penna. Farm Bureau, May 2019.

## Improve Your Soil Health Management with Farmer Research Network

Improve your soil health management practices by participating in the Pennsylvania Association for Sustainable Agriculture's (PASA) 2019 Soil Health Benchmark Study—an ongoing citizen-science project that supports vegetable farmers in monitoring soil health and planning for improvement. We are seeking more commercial vegetable farmers to join as research collaborators in 2019.

As research collaborators, participants will help to collect soil samples on their farm and share some management records regarding tillage, planting dates, and soil amendments. They receive cost-share for Cornell Soil Health tests for three fields and a detailed benchmark report illustrating the strengths and constraints of their farm's soil resources compared to peer farms. They will also have the opportunity to connect with a learning community of their peers working to fine-tune their soil health management. Join us for the 4th year of this study and contribute to this growing soil health data set that farmers everywhere can use. Contact PASA's Research Coordinator, Sarah Bay Nawa ([sarah@pasafarming.org](mailto:sarah@pasafarming.org); 814-349-9856) to learn how you can join this valuable research. Visit our website, [www.pasafarming.org](http://www.pasafarming.org), for more information.

From the **Pennsylvania Association for Sustainable Agriculture**.

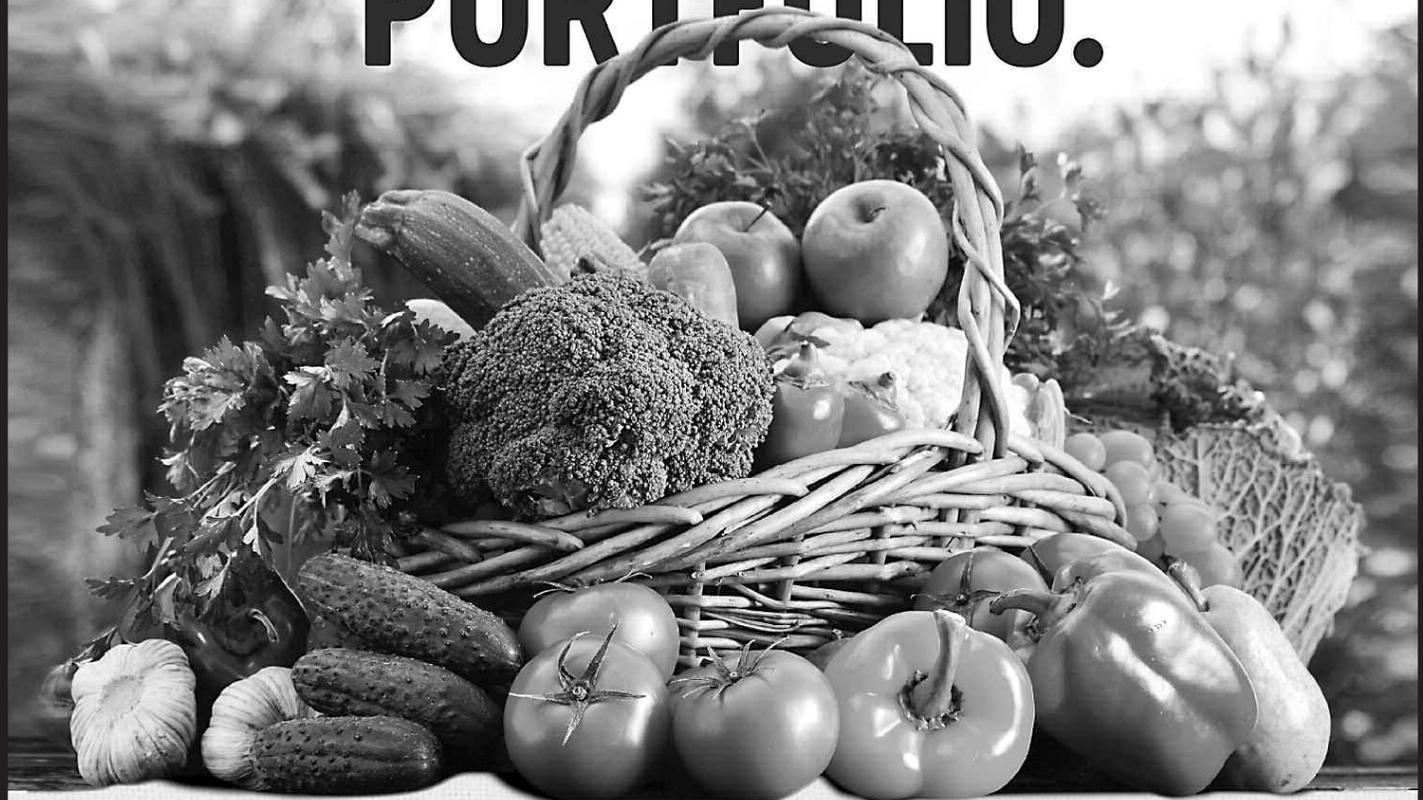


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## VEGETABLE PRODUCTION

## Current Vegetable Issues

General conditions: Many areas across the state continue to report significant rainfall events that are slowing some field activities. Some high tunnel tomatoes are beginning to ripen, and strawberry harvest is underway.

### Onions

Allium leafminer is now common in eastern and central PA. Populations have been confirmed from Massachusetts to Maryland. Symptoms confirming presence are being observed in wild Alliums in addition to onion. First emergence in Perry, Lancaster and Northumberland counties was between April 16-19 so adult flight should be ending in the next week or so. Sticky traps have been much less effective than scouting for symptoms for determining presence or phenology. Remember to rotate active ingredients when managing for allium leaf miner. Spinosads are also good for managing thrips later in the season so do not over apply in now. Heavy rain damage from severe storms was observed in onion field trials at Rock Springs (see picture). Damage is typically only observed on the exposed side of the leaf compared to thrips injury which occurs on all sides of the leaf as it grows from the base of the plant.



Diffuse damage from rain damage (left) versus linear pattern from Allium leafminer (top).

### High Tunnels

Botrytis on tomato has been observed in several greenhouses. It has a very wide host range including vegetables, fruit and ornamentals and is considered a disease of opportunity favored by cool temperatures, high relative humidity and dying tissue (i.e. senescing flowers). Cultural practices that maximize air flow and decrease relative humidity are recommended. Fungicides such as Decree, Botran and Scala can limit disease spread and are registered for greenhouse/high tunnel use.

Tomato pith necrosis is a bacterial disease caused by *Pseudomonas corrugate*. Unlike some other bacterial diseases, pith necrosis tends to affect a plant here or there and not cause significant losses. It is thought to be seed-borne and symptom expression is associated with low night temperatures, high nitrogen levels, and high humidity.

Mite and thrips damage have been observed in greenhouse cucumbers and tomato. Keep in mind that thrips can vector viruses such as tomato spotted wilt virus which has also been reported in several high tunnels across the state. It is especially important not to combine vegetable

transplants with ornamentals which can often be the source of thrips entry to the farm.

### Transplant Production

Bacterial issues have been reported on some tomato transplants (bacterial spot) as well muskmelon cv. Athena (angular leaf spot). In both cases, other growers growing transplants from the same seed lot or seed source are not experiencing the same issues. This points towards the farm being a source of the potential inoculum. Sanitation throughout the production cycle is critical for managing bacterial pathogens on all vegetable crops and especially those that are transplanted.

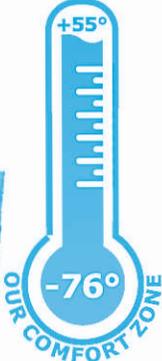
### Potato

Blackleg and potato seed. Between last year and this year there have been an increasing number of confirmed reports of the blackleg bacterial pathogen *Pectobacterium parmentieri* being associated with potato seed and symptomatic plants and tubers collected from the field. This bacterial species is one of several that are associated with blackleg of potato and has been characterized to be equally as aggressive as *Dickeya dianthicola* which emerged as an issue several years ago. It has been confirmed to cause losses both in the field and in storage. More information on management can be found here: <https://extension.umaine.edu/publications/2448e/>.

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## Fighting Birds with Lasers

In 2018, Ken and Deanna Elliot received a Northeast SARE Farmer Grant to design, build, and test their own laser scarecrows for bird control. In their final SARE Grant report, they wrote: "After piloting 9 units during the 2018 farm season, Elliot Farm reported a reduction in bird damage, recording a 20% damage rate in the height of bird season, down from the historical 80% damage rate. The farmers also found that if the lasers were used in conjunction with a bird distress call, the damage was further mitigated to just 8%. The preemptive installation of the technology was vital to crop protection success. The laser scarecrows and bird distress calls had to be up and running prior to the corn ripening to deter the birds from ever entering the field."

On March 20th, 2019, Katelyn Parsons at the Massachusetts Farm Bureau Federation (MFBF) hosted a webinar about Northeast SARE Grants for farmers. Speakers were: Katie Campbell-Nelson, SARE Massachusetts State Coordinator and UMass Extension Vegetable Program Educator, and Ken Elliot, of Elliot Farm, who spoke about his experience working with Northeast SARE on his farmer grant (FNE18-893 Laser Scarecrow Prototype see <https://projects.sare.org/project-reports/fne18-893/>). Here are Ken's words transcribed from that webinar:

"I run a 50 acre family farm in Lakeville, Massachusetts, with my sister, and I would say 40 acres of that are sweetcorn. Historically, the largest pest problem we've had are redwing blackbirds and European starlings in the corn. They last for only about 5 weeks out of the 12-15 week corn season when we are picking. But in those 5 weeks, they destroy roughly 80% of the

corn grown. Financially this is a huge hit, and every corn grower I know is going through the same thing. I've talked to people in other parts of the country and the same birds are decimating sunflower crops and sweetcorn all over the place.

We have tried the commercially available bird control options (including balloons, bird distress calls, bird repellent, reflecting tape, and netting) in the past and had terrible luck. We could only get rid of the birds for a couple of days at best. We had heard good things about lasers, but stand-alone ones that are commercially available currently cost anywhere between \$3,000-\$10,000 per unit. On a farm like mine, I have 15 different fields that are not adjoining. To cover all the corn I would need to protect at any given moment, it would be financially ridiculous to buy enough lasers to do the job.

I heard about a laser scarecrow project that Dr. Rebecca Brown at the University of Rhode Island was doing in 2017, and I decided to test out their laser. It worked fantastically, but that laser broke, probably 6 times in a 5-week period. So, a laser that doesn't work 30% of the time isn't any good either. That's what inspired me to design my own laser that would hopefully be both cheap and indestructible.

Once we figured out what we wanted to build, that's when we decided to write a grant for it. We went out and found two technical advisors; one from UMass who was an agricultural pest specialist (Sue Scheufele) and another from the Wentworth School of Technology, Steve Chomyszak (Assistant Professor in the Department of Mechanical Engineering & Technology). Steve from Wentworth helped me figure out exactly what the

(continued on page 12)

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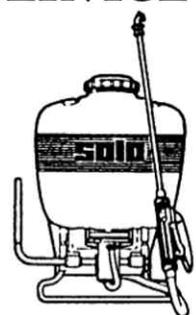
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## VEGETABLE PRODUCTION

**Fighting Birds...** (continued from page 11)

cost was going to be prior to submitting the grant so that we could estimate the costs of everything. Then we applied, and once we received the grant I was going up once or twice a month to Wentworth School of Technology where I met with Steve and four student interns who were all paid by SARE to help design this prototype and build it.

I really wanted this laser to work, not just for us, but for other farmers to be able to go out and build these things themselves. We designed it to be as simple to build as possible, and designed it so you could build it using all commercially available parts. You can go on the internet and buy absolutely every single part. We repurposed some parts. For example, we have one part that you can bend so that you can aim the laser, and I believe that specific part is generally used in a machine shop to direct oil onto a surface where they are cutting metal. Anyone can go out, get these parts, and put this thing together. From a layperson's perspective who doesn't understand how the laser works—because I'm a person who doesn't understand how it works—that's OK. As long as you follow the directions, in 3-4 hours you can build this laser for less than \$500. Parts lists and instructions can be found on our website at <https://deannaelliot.wixsite.com/laserscarecrow>.

Once we had the prototypes built, I tested 9 units on my own farm, and I didn't have the results I hoped for (which was only 1% damage). I still had about 20% damage in the corn. It wasn't fail proof, but 20% damage is a far cry from 80% damage, so we were really pretty proud with what we came up with."

**Note on Managing the SARE Grant Budget:**

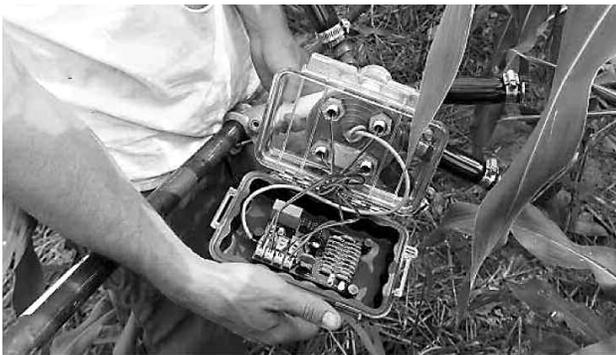
"I would say to anyone who is applying for SARE grants that although you will budget out at the beginning for how much everything costs, things are going to change, things are going to go wrong, and you'll have to touch base with SARE again to adjust that budget, move money around. You won't get more money but just let them know when the costs change. Keep track of everything. After getting 9 laser prototypes built, I tracked all the damage estimates throughout the season, and then we wrote a report, published our research and made a website with the plans to build the laser. Once we had done the work, we applied for reimbursement from SARE."

**Katelyn Parsons (MFBF):** Would you recommend these grants to other farmers?

**Ken Elliot:** Oh, absolutely, it was a wonderful experience. It helped us out by reducing bird damage which usually I would average that we lost about \$20,000 worth of corn, and we reduced that to maybe \$3,000-\$4,000 so that's a huge financial benefit. It's wonderful that we could publish this so that other people can go out, build these things, and do the same thing. I know a lot of folks who grow sweet corn, and they're all at their wits ends, just about ready to quit if something doesn't break.

**Katelyn Parsons:** Can you talk about technical advisors for SARE grants? How would you recommend farmers go about finding those?

**Ken Elliot:** What we did for technical advisors was, we found schools we knew had either a strong agricultural department or strong engineering department, and scoured their web-



The Elliot Farm laser scarecrow prototype. photo: C. Delaney, Northeast SARE.

sites for contact information for folks in those departments and blindly reached out to them. We very quickly received responses from them saying that they were eager to help us. I think, at least in my experience, if you make the effort and reach out, people in these particular careers seem more than eager to give you a hand.

*Transcribed by Katie Campbell-Nelson from Ken Elliot; Grant report text from Deanna Elliot Funded by Northeast SARE*

**Resources**

Build your own laser scarecrow by Ken and Deanna Elliot, accessed 3/23/2019,

<https://deannaelliot.wixsite.com/laserscarecrow>

"Laser Scarecrow Prototype" 2018 SARE Farmer Grant Report (FNE18-893) by Ken and Deanna Elliot, accessed 3/28/2019, <https://projects.sare.org/project-reports/fne18-893/>

"Testing laser scarecrows for neighbor-friendly bird damage reduction in sweet corn on periurban farms" SARE Partnership Grant Report (ONE17-291) by Rebecca Brown, accessed 3/28/2019, <https://projects.sare.org/project-reports/one17-291/>

*From Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Ext., Vol. 31, No. 4, March 28, 2019.*

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# Flea Beetle Feeding and Tomato Early Blight

Gerald Brust

I visited a few tomato fields this week and found 2 to 4-week-old tomato plants with some early blight (*Alternaria solani*) and in some cases bad early blight lesions. This is very early in the season to be seeing this level of early blight. Many of the plants had a few flea beetle adults on the plant (Fig. 1) and in the areas where the early blight was found also had moderate to high flea beetle feeding (Fig. 2). In some cases I could not find any flea beetles after the rains we have had and in other cases I could find a few of them. Normally the amount of flea beetle feeding I saw would not have been of much concern, but flea beetles can cause increased infections of *Alternaria* leaf blight in tomatoes and potatoes and possibly other early blight susceptible crops. I found that there was a strong relationship between the amount of flea beetle feeding and the amount of early blight on tomato plants in different fields of a few farms. If you have moderate flea beetle feeding damage to your Solanaceae plants and you see any early blight starting you'll need to control both the beetle and the disease. Pyrethroids should work well in controlling flea beetles. There is not much organically that will control flea beetles **once they are causing economic damage** (there are some things that can be done though, to reduce flea beetle problems before flea beetles cause damage, more at: <https://attra.ncat.org/attra-pub/download.php?id=135>). Using kaolin clay (Surround) before beetles begin to feed on plants is one organic possibility as is using spinosad on beetles after they start to feed.

Flea beetle adults are generally small and range in size from 0.05 to 0.15 inch. They overwinter as adults on weed hosts

surrounding the field, on residues of a previous tomato crop, or in the soil if the previous crop was a flea beetle host. Some flea beetles (*Systema blanda* – the pale striped flea beetle being one) can feed on amaranths or pigweeds (Fig. 3) and will readily move from them over to your crops. Other flea beetles are more host specific (the eggplant, potato and tobacco flea beetles feed on Solanaceous plants while others prefer broccoli, cabbage and other cole crops). However all adult flea beetles have similar damage patterns, they chew small round holes in leaves, which make them look as if they have been damaged by fine buckshot, called "shot-holing". The white larvae feed on underground parts of the plant, but this damage is usually not

(continued on page 15)

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## VEGETABLE PRODUCTION

## Pollination in Seedless Watermelons

Gordon Johnson

A female watermelon flower will need around 500-1000 pollen grains to be fertilized effectively. This will require a minimum of 8 visits by a honey bee for seeded watermelons. In seedless watermelon more visits will be required. The pollen produced by seedless watermelons is not viable. To fertilize seedless watermelon, pollen must be transferred from viable male flowers in standard or special pollinizer seeded types to triploid seedless female flowers. Because bees foraging in seedless watermelon plantings carry a mix of viable and non-viable pollen, more pollination visits (16 to 24) by honey bees are needed to set fruit.

First planted watermelons are now flowering in Delaware and Maryland. Honey bees should be placed when the first female flowers appear to achieve good crown sets without defects (i.e. prominent lobes or hollow heart). Placement should be made before 10% of plants are in bloom.

The crown set in watermelon is fruit that set on one of the first 8 nodes of the plant. This is often the most profitable, especially early in the season. Poor crown sets in watermelon can occur when there is poor weather during early flowering. Honey bee flights are reduced significantly in rain and when winds are 15 mph or greater. Cloudy weather also reduces bee activity. Honey Bees also do not fly much below 55°F, so on cold mornings, as we often have in June, bee activity will not pick up until later in the morning. Unfortunately, female watermelon flowers open early in the morning, are most receptive before 10 am, and then close in the afternoon.

In addition, in early mornings and during poor weather, bees usually visit plants closest to the hives. As the temperature rises or the weather improves, the bees will forage further from the hive. This means that in bad weather watermelons closest to the hives will have the best set and furthest from the hives will have reduced set.

Another problem that causes crown set reduction is the loss of pollinizer plants due to unfavorable weather conditions during or after planting. This means that pollen will be limiting. Research has shown that where pollen is limiting, fruit numbers will be reduced with distance from a pollen source. In fields with limited pollen, expect reduced fruit set or reduced fruit size in areas where pollinizers are missing.

Watermelon growers can manage crops for improved pollination and fruit set with honey bees by:

Increasing the number of honey bee hives for early watermelon crops. A minimum of one strong hive per acre is recommended in general and 2 hives per acre can be justified for early planted fields.

Placing hives in several locations in a field rather than just on one edge. While bees will fly over a mile, the best pollination activity is closest to the hives. Hives placed within the field will provide more bee visits to the crop compared to edge placements. Place hives in groups of 4-8 in good locations throughout the field to have even distribution of bees.

Having ample sources of pollen by planting pollinizers at a minimum ratio of one pollinizer per every 3 seedless plants. Use the most effective pollinizers as shown by local trials. In-row pollinizers should have limited competitiveness with the seedless melons.

### Bumble Bees

Compared to a honey bee, bumble bees are about 10 times more efficient as a pollinator due to their size, the speed at which they transfer pollen, the efficiency with which they gather pollen within various crops, and their increased endurance to fly in adverse weather for longer periods of time. The bumble bee also has the ability to buzz pollinate the flower for pollen, a pollination technique not seen in honey bees. Buzz pollination occurs by bumble bees vibrating the flower by pumping their wings at a certain frequency, to dislodge pollen. Bumble bee foraging activity starts earlier and ends later in the day than managed honey bees and they forage in lower temperatures. Because of these characteristics, fewer bees are needed to achieve the same crop pollination and commercial colonies only have about 200 bees each (800 per quad).

When assessing bumble bee activity, flag out 10 areas in your field and observe each area on three different days during bloom. These observations should last one minute under sunny, windless conditions, between 9 a.m. and noon. Approach each plot with care so as not to disturb the foraging bees. Stand about three feet from the crop to avoid blocking the flight path of the bees. Count and record the number of bumble bees at each flag, then calculate the average for your observations. You should have an average one bumble bee per ten flags (0.1 bees per flag) to have adequate pollination.

Bumble bee colonies should be shaded and can be placed along shaded field edges. However, if there are other wild flowers nearby, they will also work in those areas, reducing their field effectiveness. Therefore, when placing bumble bees in watermelons or other flowering vegetable or fruit fields needing pollination, it is recommended that bumble bee quads be placed in the field middles under a shade canopy to have more foraging in the target field. Bumble bees should be placed far from honey bee hives to avoid honey bee pollen theft from bumble bee nests.

*Dr. Johnson is the Vegetable and Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 27, Issue 9, May 24, 2019.*



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**VEGETABLE PRODUCTION**

**Flea Beetle Feeding...** (continued from page 13)

economically significant. There is normally a second generation during the summer and at times even a third depending on species. Normally foliar damage to larger plants is not considered to be economically important but feeding damage to small plants or seedlings can reduce stand or vigor of the plant. The other exception about flea beetles not being economic pests is when Alternaria is associated with their feeding on smaller tomato plants.

*Dr. Brust is the IPM Specialist at the Univ. of Maryland. From the Weekly Crop Update, Univ. of Delaware Extension, Vol. 27, Issue 8, May 17, 2019.*



Figure 1. Underside of tomato leaflet with two flea beetles (*Epitrix* sp)

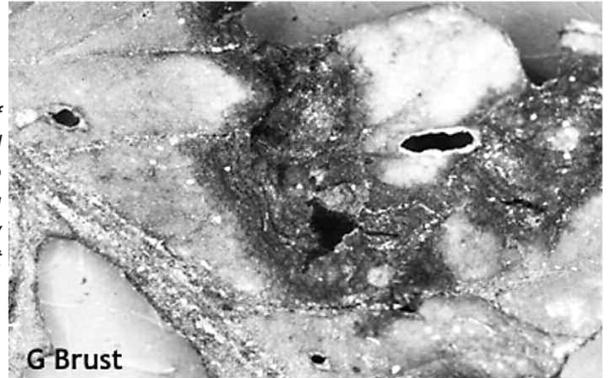


Figure 2. Tomato leaf with old flea beetle feeding and early blight

G Brust

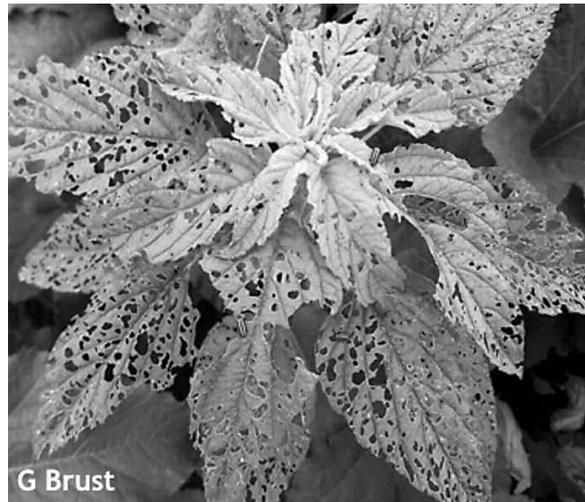


Figure 3. Pale striped flea beetle feeding on amaranthus weed

G Brust

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VEGETABLE PRODUCTION

# Beet and Spinach Leafminers

Gerald Brust

In high tunnels and in the field, I have seen spinach and beet leaf miners *Pegomya hyoscyami* and *P. betae* respectively in swiss chard and spinach. These leafminers are a type of blotch leafminer, creating irregularly shaped mines. These flies attack crops and weeds in the plant family Chenopodiaceae, which includes chard, beets, and spinach and the weed lamb's quarters. These fly species are very similar, but the spinach leafminer may also feed on Solanaceous crops such as peppers.

Adults are small flies about 1/3 inch in length and gray to brown. Larvae are whitish and cone-shaped. Flies of both species overwinter as pupae in the soil. In April and May, flies emerge and lay white eggs in groups of 4-8 on the underside of leaves (Fig. 1). Eggs hatch and larvae begin feeding between



G Rovegno, Crossroads Community Food

leaf tissues creating mines (Fig. 2). As the larvae feed and develop, they create areas of dead tissue where they have fed. These areas are opaque at first and then later turn brown (Fig. 3). Once inside the leaf tissue larvae are difficult to control. The larvae are active for about two to three weeks, before dropping to the ground and pupating in the soil. The entire life cycle is 30-40 days. There are three to four generations per season. Once the summer is over, leafminers will overwinter as a puparium in the soil emerging in early spring the next year to start the cycle again.

Figure 1. Leafminer eggs are white and laid on underside of leaf

Leafminer feeding has little impact on overall plant growth but can be quite damaging to vegetables grown for edible greens. So, a crop such as Swiss chard or spinach that you are trying to sell the leaves of are greatly impacted while something



G Brust, University of Maryland

Figure 2. Leafminer eggs have hatched and larvae are mining between leaf layers

such as turnips or beets that you are selling the bulbs of are less impacted (unless you are selling the tops too).

The damage to the Swiss chard and spinach I saw probably could have been far less if the first infested leaves with leafminers or fly eggs had been removed or destroyed. Any additional plantings of spinach or chard this season (or next year) on this farm should be planted in a different area of the field because of pupae still in the soil. Once the spinach or chard is planted in a new area a row cover or chemicals can be used to protect the plants and keep the leafminer flies that emerged from previously infested sites from laying eggs.

Because these leafminers feed mostly on one crop group and some weeds that include chickweed, pigweed and lamb's quarters,

weed control and crop rotation are important management tools. Chemical controls such as dinotefuran, thiamethoxam and spinetoram (spinetoram also has translaminar activity and if combined with an adjuvant is more effective against larvae) are foliar and soil controls for use in spinach. Chemical controls for leaf



G Brust, University of Maryland

Figure 3. As larvae grow their damage becomes more pronounced

miners in other crops are more limited, so check the [2019 Mid-Atlantic Commercial Vegetable Production Recommendation](#) guide and always follow label instructions. For organic production spinosad can provide good control if used at or before egg laying and has only minor impacts on natural enemies. Neem oil can be used to prevent egg laying but is not as effective as spinosad. As always thorough coverage is necessary for good control which includes getting the material to the underside of the leaf.

*Dr. Brust is the IPM Vegetable Specialist at the of Maryland. From the Weekly Crop Update, Univ. of Delaware Extension, Vol. 27, Issue 10, May 31, 2019.*

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# Monitoring Nutrient Status in Vegetable Crops

Gordon Johnson

June means warm weather and long days and spring plant-ed vegetable crops are growing rapidly. Monitoring the mineral nutrient status of vegetable plants is important to evaluate ferti-lity programs and to make adjustments. Recommended fertility programs for vegetable crops are given in the Commercial Vegetable Production Recommendations publication for Delaware and surrounding states. See <http://ag.udel.edu/extension/vegprogram/publications.htm> for an electronic version.

While these recommendations should be the base of a fer-tility program, additional monitoring of plant nutritional status is recommended, especially for highly managed crops such as those grown in plasticulture where fertilizers can be injected through the drip irrigation system. Tools that are available include tissue testing, petiole sap testing, or the use of instru-ments such as a chlorophyll meters or NDVI sensors to monitor plant nutrient status.

Tissue testing involves taking samples from the plant (most commonly leaves) at various times during the growth period and sending them to a laboratory for mineral nutrient analysis. Petiole sap testing involves taking leaf petioles and expressing the sap which is then tested for nitrate and/or potassium using portable meters. Chlorophyll meters are used to measure “greenness” of individual leaves and NDVI sensors are used over top of crop canopies to measure the amount of green foliage.

When taking tissue samples, specific procedures should be followed to obtain reliable results. For whole leaves, the sample

should not have any stem material. For sweet corn or onions, the leaf is removed just above the attachment point to the stalk or bulb. For compound leaves (beans, tomatoes, etc.), the whole leaf includes the main petiole and all the leaflets. With heading vegetables like cabbage take the outermost whole wrapper leaf. For young plants, the whole above-ground portion of the plant is sampled.

Most tissue tests are done using the most recently matured leaves (MRML) for analyses. Most-recently-matured leaves are leaves that are full size and have changed from the young leaf light-green color to a darker green color.

For each sample take 25 to 50 individual leaves. More accuracy in determining the actual nutrient status is derived from a larger sample size. Leaves of the same age (physiologi-cal age and position) should be removed from each sampled plant (the MRML). Plants damaged by pests, diseases, or chemicals should be avoided as well as plants with dust accu-mulation. Samples should be air-dried before shipment and paper (not plastic) bags should be used to ship or samples to the testing lab.

Tissue test results are interpreted using critical value tables. Results are commonly placed in the following cate-gories:

**Deficient** – nutrient levels are below a critical value and plants are being affected. Corrective measures will be needed with additional fertilization.

*(continued on page 18)*

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## VEGETABLE PRODUCTION

## Diseases of Onion

Onions and garlic are subject to numerous leaf and bulb diseases caused by fungi and bacteria which occur both in the field and in storage. While it might seem early to be thinking about diseases in your onions, all of them can overwinter in crop residues and cull piles and return year after year, and they cause losses in storage not just damage in the field. If you are the modeling sort, there is a NEWA onion disease forecast tool at <http://newa.cornell.edu/index.php?page=onion-disease-forecast> which can help you determine whether conditions are favorable for disease and if a fungicide spray is warranted, check it out!

### Fungal Diseases

**Botrytis Leaf Blight** (*Botrytis squamosa*) overwinters in onion cull piles, on onion leaf debris, or as sclerotia (small masses of fungal tissue that survive long-term in soil). Infection occurs under favorable conditions—leaf wetness and moderate temperatures (72-75°F)—and spores are produced on leaf tissue and are then spread by wind. Disease incidence increases with longer periods of leaf wetness. Early symptoms are small, gray to white oval spots on leaves. The spots have a distinctive silvery-white “halo” with uneven margins. The centers of many spots become sunken and straw-colored. Eventually the whole leaf may be covered in spots and the leaf will die back. Older or dying leaves are more susceptible to blight. Yield losses occur because premature leaf senescence prevents bulbs from sizing up.

**Purple Blotch** (*Alternaria porri*) has been reported on onion, garlic, and leek and probably occurs on other *Allium* species as

well. The pathogen overwinters on infected bulbs and debris in the field, and can be seed-borne in onion. Symptoms first appear on leaves as small water-soaked lesions with white centers. Growing lesions develop concentric rings, with surrounding tissue turning yellow and lesion centers appearing brown to purple. In moist weather, the surfaces of the spots usually develop a brown-black, powdery fungal growth. Leaves with large spots turn yellow and die. Leaves with wounds from thrips feeding injury or abrasions from sandblasting that can occur during windstorms are more susceptible to purple blotch. Older leaves and older plants are more susceptible than young plants. Spores require rain or persistent dew to cause infection. Optimum temperatures are 77 to 81°F—almost no infection occurs below 55°F. The pathogen may enter bulbs at harvest through the neck or wounds. Bulb decay first appears as a watery rot around the neck and is particularly noticeable because of the yellowish to wine-red discoloration in the neck region. As the fungus moves through onion scales, the tissue turns yellow then wine-red and dries to a papery texture.

**Downy Mildew** of onions, shallots, leeks, garlic, and chives is caused by the airborne oomycete *Peronospora destructor*. This disease is not as common as *Botrytis* leaf blight or purple blotch, but when conditions are favorable for downy mildew, it can destroy an onion crop very quickly. The first symptoms are irregular pale green or yellow patches on the leaf. Later the pathogen produces spores which start out clear and then become gray to purplish, and can resemble purple blotch. The lesions girdle onion leaves and they often become bent at the

(continued on page 19)

### Monitoring Nutrient... (continued from page 17)

**Low** – nutrient levels are below a critical value and plants may be affected. Corrective measures may be needed with additional fertilization.

**Adequate** – nutrient levels are in a range for normal growth

**High** – nutrient levels are above the range for normal growth and may indicate over-fertilization

**Very High** – nutrient levels are above the range for normal growth may be damaging to the plant or may indicate luxury consumption

In some lab results low and deficient categories are combined and very high may not be used unless a toxicity is detected.

Petiole sap testing is useful for monitoring nitrogen and potassium and can give very quick results with the use of portable meters. For sap testing, petioles collected from most recently matured leaves (MRML) are used for analyses (see above). A random sample of a minimum of 25 petioles should be collected from each field or zone of 20 acres or less. Leaves with obvious defects or with diseases should be avoided. Sampling should be done the same time of day (best between 10 a.m. and 2 p.m.).

To take petiole samples, collect whole leaves from the plant and then remove the leaf blades and leaflets. A petiole of several inches in length remains. Petioles are chopped into about one-half inch segments, crushed in a hand press, and sap is collected in a cup. Follow the instructions for the specific meter you are using to analyze the sap.

Petiole sap results are normally given in the expected range for good growth at a given crop stage.

We have added critical tissue test values and petiole sap test values to the Commercial Vegetable Production Recommendations for many vegetable crops. These can be found at: <http://extension.udel.edu/ag/vegetable-fruit-resources/commercial-vegetable-production-recommendations/> online.

The chlorophyll meter is a tool that is useful to monitor nitrogen status. Test plants are fertilized with extra nitrogen so they become fully green. These test plants are then compared with the crop with normal fertilization. Again 25-50 MRML leaves are tested by clamping the sensor head to the leaf and recording the reading. The sensor should be placed in the portion of the leaf blade without large veins, midrib, or folds. Major differences between test plants and normally fertilized plants indicates lower nitrogen status and that additional nitrogen may be necessary.

NDVI sensors have been used for on-the-go sensing of crops for nitrogen status. High nitrogen test strips are used to compare with sensor readings in the field. There is the potential for on-the-go nitrogen sidedressing of crops such as sweet corn using this technology.

*Dr. Johnson is the Vegetable and Fruit Specialist at the Univ. of Delaware. From the Weekly Crop Update, Univ. of Delaware Extension, Vol. 27, Issue 10, May 31, 2019.*

VEGETABLE PRODUCTION

**Diseases of Onion** (continued from page 18)



Early symptoms of *Botrytis leaf blight* — small white to gray oval spots on leaves. Photo: L. du Toit.

yellowed spot. Disease often starts in patches in a field or in a certain variety and is favored by cool (less than 72°F), humid weather. The pathogen overwinters as mycelium in crop debris or cull piles and spreads when conditions are favorable. Because the pathogen is an oomycete and not a true fungus, fungicides that control *Botrytis* or purple blotch may not control downy mildew.



Purple blotch lesions develop concentric rings as they develop. Photo: S.B. Scheufele.

**White Rot** (*Sclerotium cepivorum*) is one of the most widespread and destructive fungal diseases of Allium species. This disease occurs wherever onions are grown, especially when a significant part of crop growth occurs during cool temperatures, which favors the pathogen. *Sclerotium cepivorum* produces sclerotia—small masses of fungal tissue, surrounded

by a dark rind—that persist in the soil for years. Disease is spread by movement of infested soil and infected sets or transplants. Symptoms include leaf yellowing and premature leaf dieback. Plants become stunted, and rapid death of all foliage follows. In fields with bad infestations, plants may die suddenly in large areas. Infected plants will develop fluffy fungal mycelium on the stem plate, and small sclerotia (about the size of poppy seeds) will form in and on the surface of affected bulb parts, often around the neck. White rot can continue to spread in storage if humidity is not kept low. Note that the closely related *Sclerotinia sclerotiorum* and *S. minor* have also been reported to cause white mold in Allium. They have broad host range including tomato, lettuce, cabbage, carrot and bean while *S. cepivorum* is specific to alliums.

**Fusarium Basal Rot** affects Allium species including onion, garlic, shallot, and chives. This disease is primarily caused by *Fusarium oxysporum f. sp. cepae*. The fungus produces long-lived survival spores that can persist in the soil for many years, and can be spread on infested onion sets and garlic cloves. Plants can be infected at any stage of growth. Disease incidence increases with injury to roots, basal plate, or bulbs by onion maggots and other insects. Above-ground symptoms of root infections include leaf yellowing and curving. Leaves will begin to die back from the tip downwards. Infected plants may wilt, and affected bulbs may turn red to purple and appear brown and watery when cut open. This disease progresses from the stem plate up to storage leaves and the roots will eventually rot. Bulbs may exhibit no disease at harvest, but subsequently decay in storage. The most effective methods of control is

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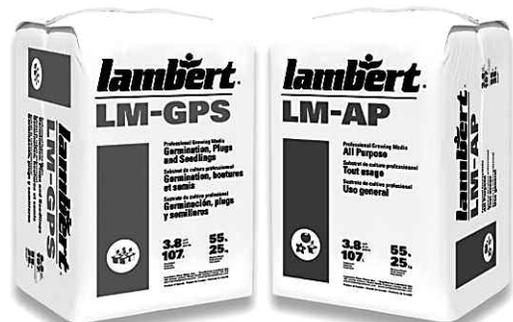
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## VEGETABLE PRODUCTION

**Diseases of Onion** (continued from page 19)

using resistant varieties and planting only healthy onion sets/garlic bulbs.

**Bacterial Diseases**

Bacterial diseases occur when bacterial cells enter leaf tissue via wounds caused by thrips damage, sandblasting by wind, or during harvest. Bacteria move into the bulb and are often not evident until the harvested crop is stored and used. Therefore, controlling onion thrips is very important, especially in storage onions, as their feeding damage can be an entry point for these pathogens. Control measures should include proper maturing of the crop, rapid drying after harvest, topping only after necks have dried fully, and proper storage at 32-34°F.

**Slippery skin** is a bacterial disease caused by *Pseudomonas gladioli* pv. *alliicola*. In the early stages of the disease, affected bulbs may show no external symptoms except softening of neck tissue. If the bulb is cut longitudinally, inner scales are soft and water-soaked. The rot progresses from the top of the infected scales downward and eventually the whole bulb may rot. The bacterium enters via wounded leaf tissue and attacks leaves and bulbs in the field just before or at harvest time. Mature bulbs are very susceptible.

**Sour skin** (*Burkholderia cepacia* – previously *Pseudomonas cepacia*) causes light brown decay and breakdown of one or a few inner bulb scales. The bulbs appear intact and remain firm, but rot proceeds internally. The bacterium is a versatile organism, found in soil and water or as a pathogen of plants and/or animals, and is favored by high temperatures. Onions are relatively resistant to infection before bulb formation.

**Disease Management**

- Practice long rotations with non-allium crops. Plant alliums into disease-free soil.
- Plant high quality onion seed, slips, and transplants free of contamination.
- Use resistant varieties where available (look for resistance to Fusarium diseases and Purple Blotch).



Onion downy mildew lesions develop dark sporulation like purple blotch, but lack concentric rings. Photo: K. Campbell-Nelson



Fluffy white fungal growth characteristic of white rot. Photo by G.Q. Pelter



Wilting and foliar dieback, caused by *Fusarium basal rot* (above). Bases of bulbs appear purple-brown and watery when cut open (below). Photos by H. Schwartz

- Control weeds.
- Control onion thrips. Conventional and organic insecticides are available. See the [Mid-Atlantic Commercial Vegetable Recommendations] for recommendations.
- Conventional and organic fungicides can be effective in controlling Botrytis, purple blotch, and downy mildew. See the [Mid-Atlantic Commercial Vegetable Recommendations] for the latest recommendations.
- Destroy onion debris after harvest.
- Sanitize harvest tools regularly to prevent spreading bacteria.
- Closer in-row spacing (4" instead of 6" or 8") has been shown in trials to reduce incidence of bacterial bulb decay at harvest, but may increase leaf wetness and risk of fungal diseases.
- Avoid excess (greater than 200 pounds per acre) or late (after July 15) applications of nitrogen. Split nitrogen applications are recommended.
- Avoid moving contaminated soil between fields. Clean tractors and equipment between fields.
- Do not irrigate within 10 to 14 days of harvest. Avoid harvest after heavy rains.
- Avoid mechanical injury and bruising of bulbs during production and harvest.
- Undercut crop prior to harvest to sever all roots and prevent larger wounding during harvest.
- Cure in a well-ventilated area at 70-80°F. Under wet conditions when bulbs cannot be cured adequately, artificial drying with forced hot air followed by normal storage should be considered.
- Store bulbs with good ventilation at 32-34°F with 70-75% relative humidity. Regulate humidity to prevent condensation from forming on bulbs.



Symptoms of slippery skin. Photo by H. Schwartz



Sour skin causes individual bulb scales to rot. Photo by D.B. Langston

Revised by the Univ. of Massachusetts Vegetable Team 2018. From the **Vegetable Notes for Vegetable Farmers in Massachusetts**, Univ. of Mass. Ext., Vol. 31, No. 7, May 23, 2019.

## Striped Cucumber Beetle and Bacterial Wilt

Gerald Brust

Striped cucumber beetles (*Acalymma vittatum*) (SCB) are the most important insect pests of muskmelon and cucumbers in our area. They overwinter as adults and emerge when temperatures reach 54–62°F at which time they begin searching for cucurbit hosts. Volatiles produced by the plant attracts SCB to cucurbits initially, then male SCBs produce an aggregation pheromone attracting more beetles. The beetles tend to mass on small plants where they eat, mate and defecate (Fig. 1).

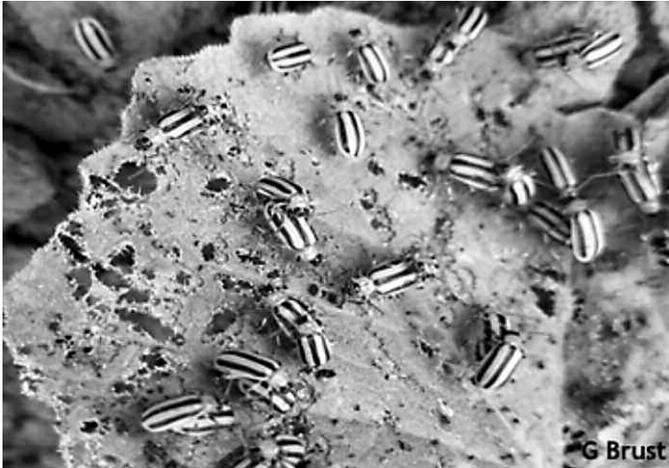


Figure 1. Early season feeding of SCB on cucumber.

This type of frenzied activity where there are many beetles feeding on a few leaves or a small plant leads to increased chances of bacterial wilt development. The bacterium that causes bacterial wilt in cucurbits, *Erwinia tracheiphila*, is in the cucumber beetle's feces. As the beetles defecate on the leaves where they are feeding the bacteria can be moved into open (feeding) wounds with water that is in the form of precipitation or dew. The more beetles that are feeding and opening wounds on susceptible crops like cucumbers and cantaloupe the greater the chance of bacterial wilt infection. The bacteria multiply and block plant xylem, restricting water flow to the rest of the plant; plants wilt and eventually die (Fig. 2). The wilting usually starts with just one heavily chewed upon leaf wilting and then this wilt-



Figure 2. Cantaloupe plant killed by bacterial wilt infection.

ing progresses to the stem of the leaf and then to major vines of the plant. This process of vines and the entire plant wilting down can take 2-6 weeks after initial infection, but because the non-infected parts of the plant continue to grow growers might think when they see a plant wilt down that infection took place just within the last few days (Fig. 3).

One additional problem with SCB and why control sprays may not work as well as they should under some conditions is that the beetles are consistently hiding at the base of the plant (in the plastic hole) where they are feeding on the stem (Fig. 4). Sprayers are set up usually to cover a lot of leaf canopy and often do not do a very good job of putting chemical down in the plant hole. This stem feeding can be severe enough to cause some wilting. It is hard enough to control cucumber beetles with a good cover spray, but when only small amounts of spray are reaching them down in the plastic hole they will not be controlled.

Melon cultivars have different susceptibilities to bacterial wilt infection. Watermelon is almost immune to infection while squash and pumpkin are moderately susceptible. Cantaloupe and cucumbers as well as some of the specialty melon types are much more susceptible. Among the most susceptible culti-



Figure 3. Only the leaves at the base of the plant (arrows) were initially infected with *E. tracheiphila* but the whole plant eventually will die.

(continued on page 23)

## BERRY PRODUCTION

## Strawberry Renovation

Gordon Johnson

As strawberry season winds down in June, it will be time to consider renovation options depending on the production system.

### Matted Row Systems

In matted row strawberries, the goals in renovation are to reduce plant numbers by narrowing the rows, remove old foliage (reduces diseases), control weeds, reduce insect and mite pests, and promote new runner development (production of daughter plants). After renovation, regular irrigation and weed control are essential. High yields next year depend on having large, healthy, vigorous plants when fruit buds are initiated in late summer.

With matted rows, renovation starts with an application of 2,4-D amine herbicide (Weedar 64) after the last harvest. If grasses are a problem a sequential application of sethoxydim (Poast) or clethodim (Select) may be necessary (do not tank mix with the 2, 4-D). After the last herbicide application, wait 3-5 days and then mow off the strawberries to just above the crown (do not damage the crown). Apply nitrogen fertilizer (25-60 lbs N/acre) at this time. Using a split N application half at renovation and half 4 weeks later is preferable. If other nutrients were low or deficient (as indicated by tissue tests prior to fruiting) then apply at this time. Subsoil fields with compaction from equipment or heavy foot traffic between the rows (U-pick plantings for example).

Next, narrow the rows with a cultivator, coulters/discs, a rotary tiller/multivator or other devices to 12-18 inches at the base. Matted row strawberries are edge bearers and benefit greatly from this narrowing. Strawberries produce new roots higher on crowns each year so try to throw about 1/2 -1 inch of soil over the row (without covering the crowns). This will also help new daughter plants root (runners produced from mother plants).

After narrowing the rows apply preemergence residual herbicides. Apply 2-4 ounces of terbacil (Sinbar). This is one half the annual rate. Sinbar can injure some varieties and attention should be paid so as not to have overlaps. If Sinbar is not used, DCPA (Dacthal) may be applied at this time. This material requires adequate rainfall or overhead irrigation for activation. Dacthal benefits from being lightly incorporated (possible in row middles). During the summer, cultivate between rows to remove weeds and to sweep runners into the row. From late summer on, cut off any additional runners during cultivation (discs or coulters work best).

Weeds in the rows must be controlled throughout the summer. Sethoxydim (Poast) or clethodim (Select) may be sprayed over the top to control grass weeds. Clopyralid 0.12-0.25 lb (Stinger 0.33-0.67 pt/A) has a 24c label for use in MD, NJ, VA, and PA for over the top control of some broadleaf weeds. Hand hoeing will be necessary for removal of remaining weeds.

Irrigate strawberries so that they receive 1.5 inches of water (combined rainfall and irrigation) each week during the summer. Irrigation during late July and August are very critical to produce large plants as flower buds will be initiated starting in August. Continue irrigation (at reduced rates) through the fall until dormancy. Strawberries may benefit from low amounts of additional nitrogen fertilizer (25 lbs of N/acre) later in summer depending on the vigor.

### Plasticulture Systems

With the high cost of establishing strawberries planted on plastic mulch, many growers choose to carry them over for another year. First, evaluate the disease pressure on the planting. If anthracnose was a major problem, you should not carry the planting over. If disease pressure was low, then renovation can proceed.

The goals in renovating plasticulture strawberries are to remove old foliage, remove any runners formed, remove diseased plant material from the field, control weeds, reduce insect and mite pests, and reduce crown size of very large plants.

Mow the strawberries as close to the crowns as possible without damaging them. Remove any diseased plant material from the field. Plants with more than 5 branch crowns will benefit from thinning. Using an asparagus knife, remove one half of the crown. Apply weed control measures between plastic beds (herbicides, cultivation, or combination) being careful not to apply herbicides over the plastic beds. Irrigate strawberries so that they receive 1.5-2 inches of water each week during the summer. Fertigate with 40 to 60 pounds of nitrogen per acre in late August and add any additional nutrients as suggested by tissue tests. Continue irrigation as needed throughout the fall.

The key for carryover strawberries on plastic is not to have too many crowns going into the fall. Excessive crown numbers will reduce berry size greatly. Carry over beds should not be row covered until winter to avoid excessive growth and may not need row covers in mild winters until the frost protection period in March and April during flowering.

### Day Neutral (Repeat Blooming Types) Renovation on Plastic

The decision on when and how to renovate day neutral plasticulture strawberries differs from June bearing types in that production can continue into the summer, picking up again in the fall.

With fall planted day neutrals consider renovation in July when production slows. Mow the strawberries as close to the crowns as possible without damaging them. Remove any diseased plant material from the field. Plants with more than 5 branch crowns will benefit from thinning. Using an asparagus knife, remove one half of the crown. Apply weed control measures between plastic beds (herbicides, cultivation, or combination) being careful not to apply herbicides over the plastic beds. Irrigate strawberries so that they receive 1.5-2 inches of water each week during the summer. Fertigate with 40 lbs/a N at the July renovation and fertigate again with 20-40 lbs/a N and 40 lbs/a K when first bloom appears in the fall.

With spring planted day neutral strawberries, remove runners throughout the season. If production stops, maintain plant health by regular irrigation and disease, mite and insect management. In mid-August, fertigate with 40 lbs/a N and fertigate again with 20-40 lbs/a N and 40 lbs/a K when first bloom appears in the fall.

*Dr. Johnson is the Vegetable and Fruit Specialist at the Univ. of Delaware. From the Weekly Crop Update, Univ. of Delaware Extension, Vol. 27, Issue 10, May 31, 2019.*

## Current Berry Issues

Harvest has begun in the southeastern part of the state. With wet conditions in 2018 and so far in 2019, anthracnose and Botrytis are prevalent. Symptoms of anthracnose and management recommendations are in this related article <https://extension.psu.edu/anthracnose-on-strawberry-fruit>. Materials for Botrytis on strawberries are listed in the Mid-Atlantic Vegetable Production recommendations in the "Strawberries" section along with fungicide rates and products for anthracnose. Despite the wet conditions, thrips and tarnished plant bugs are prevalent on strawberries on several farms. Wet conditions and resultant herbicide failures likely are causing excessive weed growth on which these pests have multiplied. Other observations include common leaf spot on strawberry and Phomopsis cane blight and other leaf spots on blueberry. Any practices that minimize leaf wetness will help with managing these issues. Blueberry recommendations for disease and insect management can be found in the 2018 New Jersey blueberry recommendations found here <https://njaes.rutgers.edu/pubs/publication.php?pid=e265> in lieu of an updated Mid-Atlantic Berry Guide. With rare exceptions in materials labeled only for New Jersey (check the labels), these are the same rates and products that would normally appear in the Berry Guide.

*From Penn State Extension Educators and Researchers*

### Striped Cucumber... (continued from page 21)



Figure 4. Striped cucumber beetle feeding damage at base of small plants

vars are, Honeydew 252 and HD150 which are honeydew melons; Da Vinci which is a Tuscan type melon and Miracle and Sheba which are a netted yellow-green melons. Among the most tolerant cantaloupe cultivars are Aphrodite, Athena, Accolade and Astound which are all eastern cantaloupes and just happen to all start with A. The management methods that are recommended for bacterial wilt control for standard cantaloupe varieties (using seed treatments and insecticides when beetles reach 1 per plant or using kaolin clay or row covers before beetles appear) work well. For the specialty melons more attention is needed to carefully follow management recommendations.

*Dr. Brust is the IPM Specialist at the Univ. of Maryland. From the Weekly Crop Update, Univ. of Delaware Extension, Vol. 27, Issue 9, May 24, 2019.*

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