

NEWS

March 2021 / Volume 44 Number 3

for the commercial vegetable, potato and berry grower



Family-Owned Operations Account for 96% of US Farms, USDA Finds

Family farms comprise 96% of all U.S. farms, account for 87% of land in farms, and 82% of the value of all agricultural products sold.

This is according to the 2017 Census of Agriculture Farm Typology report released today by the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS).

The farm typology report primarily focuses on the "family farm," defined as any farm where the majority of the business is owned by the producer and individuals related to the producer. The report classifies all farms into unique categories based on two criteria: who owns the operation and gross cash farm income (GCFI). GCFI includes the producer's sales of crops and livestock, fees for delivering commodities under production contracts, government payments, and farm-related income.

"Classifying America's 2 million farms to better reflect their diversity is critical to evaluating and reporting on U.S. agriculture," said NASS Administrator Hubert Hamer. "Typology allows us to more meaningfully explore the demographics of who is farming and ranching today as well as their impact on the economy and communities around the country."

The data show that small family farms, those farms with a GCFI of less than \$350,000 per year, account for 88% of all U.S. farms, 46% of total land in farms, and 19% of the value of all agricultural products sold. Large-scale family farms (GCFI of \$1 million or more) make up less than 3% of all U.S. farms but produce 43% of the value of all agricultural products. Mid-size farms (GCFI between \$350,000 and \$999,999) are 5% of U.S. farms and produce 20% of the value of all agricultural products.

The data also show that the number of family farms decreased by 4% (almost 80,000 farms) since 2012. Large and mid-size family farms experienced steeper declines, decreasing 13% and 8%, respectively. Small family farms experienced a smaller decline (3%).

Other key findings from the 2017 Census of Agriculture Farm Typology report include:

Southern and New England states have the highest share of small family farms. Midwestern and Northern Plains states have the lowest share. Conversely, the share of mid-size and large-scale farms is highest in the Midwest and Northern Plains states.

Farm specialization varies by farm size. The majority (57%) of small family farms specialize in cattle (34%) or "other crops" such as hay and forage production (23%). Over half (53%) of mid-size farms specialize in grains and oilseeds. Large-scale family farms vary more in product specialization, though they are more likely than other family farms to specialize in dairy production or specialty crops.

Small family farms account for 45% of all direct sales to consumers, compared to 17% for mid-size family farms and 23% for large-scale family farms.

Compared to producers on mid-size and large-scale family farms, small family farm producers are more likely to be women, age 65 or older, and report being of Hispanic origin or a race other than white. They are also more likely to be new and beginning farmers (farmed 10 years or less) and to report having military service.

Access the full farm typology report and additional information such as maps and data Highlights on the NASS website. Typology data are also available in the NASS Quick Stats database.



OUTSTANDING SEED COMPANY, LLC®

B R E E D E R | P R O D U C E R

Outstanding Seed is an innovative seed company specializing in breeding, production, and marketing of proprietary, large handled, high yield potential, Powdery mildew resistant pumpkin, gourd, and winter squash hybrids.

Outstanding Seed hybrids are bred for large handles, high yield potential, and Powdery mildew resistance. For this reason, Outstanding Seed hybrids are market leaders in yield potential and profit potential.

Over forty hybrids are available to meet many different needs. Call today to place an order or request our 2021 Catalog.

Daybreak_{F1}

- Large, flat, lobed fruit, great for stacking.
- Average fruit weight is 28 lbs. or more.
- Shades of red, pink, salmon, and blue.
- Strong Powdery mildew resistance.
- Excellent yield potential.
- FarMore® treated seed and untreated seed are both available.

NEWS

National News Briefs

Farmers Can Continue to Apply for Expanded COVID Relief

The U.S. Department of Agriculture is expected to give farmers more time to submit new or revised applications for the expanded Coronavirus Food Assistance Program, which offers direct payments to producers to help offset losses caused by the COVID-19 pandemic.

As of early March, no official announcement had been made; however, USDA Secretary Tom Vilsack indicated that the agency was planning to extend the deadline.

In early January, USDA reopened CFAP to some producers who were not previously eligible and allowed some previously eligible producers to revise their applications to take advantage of updated payment rates for certain commodities.

USDA has temporarily paused processing of CFAP applications and payments as part of a government-wide review by President Joe Biden's administration of regulatory action taken at the end of former President Donald Trump's administration. USDA is continuing to accept applications.

In a letter to Vilsack, Farm Bureau urged USDA to give farmers an additional 30 days after the processing freeze is lifted to apply for the program.

"Although Farm Service Agency offices continued to accept applications during the regulatory freeze, some farmers may have interpreted the implementation suspension to mean that the program was being modified or potentially terminated," American Farm Bureau Federation President Zippy Duvall wrote. "Additionally, in mid-February farmers and ranchers in many portions of the country experienced hazardous travel conditions, power outages and broadband disruptions that not only impacted their farm operations, but may have impacted their ability to complete the application process for the CFAP program."

Farmers should continue to apply for the program at this time. In addition, USDA is allowing certain producers to modify

existing CFAP applications to reflect updated payment calculations. Visit <http://bit.ly/3iftMP7> for details on updated payment calculations for:

- Certain producers of specialty crops, aquaculture, tobacco, specialty livestock, nursery crops and floriculture.
- Certain producers with crop insurance coverage who grew barley, corn, sorghum, soybeans, sunflowers, and wheat.

Newly eligible producers who need to submit a CFAP application or producers who need to modify an existing one can do so by contacting their local USDA Service Center. New applicants can also obtain one-on-one support with applications by calling 877.508.8364.

Learn more at www.farmers.gov/cfap.

From *Pennsylvania Agricultural Alliance Issues Update*,
Penna. Farm Bureau, March/April 2021.

Bill Would Increase Borrowing Flexibility for Farm Programs

Legislation was recently introduced in Congress that would more than double the borrowing limit for U.S. Department of Agriculture programs that support farmers.

The measure would increase to \$68 billion the annual borrowing limit for the Commodity Credit Corporation, USDA's financing tool for many farm bill programs and other initiatives, such as recent relief programs related to COVID-19 and trade. The CCC's borrowing limit was capped at \$30 billion in 1987 and has not been increased to keep up with inflation.

"Congress must have farmers' backs by expanding USDA's borrowing authority under the Commodity Credit Corporation," American Farm Bureau Federation President Zippy Duvall said. "There is a long history of the CCC being tapped to responsibly support agriculture in times of crisis. This should be no different."

From *Pennsylvania Agricultural Alliance Issues Update*,
Penna. Farm Bureau, March/April 2021.

State News Briefs

Game Commission Gives Preliminary Approval to Species Expansion for Sunday Hunting

The Pennsylvania Board of Game Commissioners gave preliminary approval to a slew of changes to the seasons and bag limits for the upcoming 2021-2022 hunting season at their virtual meeting on Jan. 23. Included in these changes are the expansion of species that would be allowed to be hunted on two of the authorized Sundays.

The board approved a measure that would expand the species allowed to be hunted on Sunday, Nov. 14 and Sunday, Nov. 21 to include most small game species, along with deer -archery and bear-firearms, which were allowed for the first time last season. The species to be added are squirrel, ruffed grouse, rabbit, ring-necked pheasant, bobwhite quail, woodchuck (groundhog), opossum, striped skunk, weasel, raccoon and porcupine. Pennsylvania Farm Bureau submitted comments opposing this change.

Also approved were a 14-day concurrent antlered and antlerless deer season, a move to allow hunters to apply for and carry extra antlerless tags, and an extension to the DMAP application deadline, all of which Farm Bureau supports.

The 'unlimited' antlerless tag provision would allow hunters to purchase extra antlerless licenses over the counter starting on the second Monday of Sept. Hunters would be allowed to have four unfilled tags at a time, and could purchase more as they fill

their tags, as long as there are tags still available. The PGC hopes to get more allocated antlerless tags filled during the hunting season with this change. The first three rounds of application would remain unchanged.

The board also approved an extension of the deadline for landowners to apply to enroll their properties in the Deer Management Assistance Program (DMAP). The annual deadline would be extended from May 1 to June 1.

All of the above changes are preliminary and would need to be approved at the next board meeting in April. Comments can be submitted to the board ahead of the meeting by emailing pgcomments@pa.gov.

From *Pennsylvania Agricultural Alliance Issues Update*,
Penna. Farm Bureau, March/April 2021.

Committee Advances Wedding Barn Bill

Legislation that would make it easier for farmers to rent out barns and other on-farm buildings for weddings and similar social events has cleared its first hurdle in the General Assembly.

The state Senate Labor and Industry Committee voted 7-3 last month to advance Senate Bill 191, sponsored by Sen. Judy Ward of Blair County. The measure now heads to the full Senate for consideration.

The bill would exempt certain agricultural buildings that are

Continued on page 4

NEWS



*Pennsylvania
Vegetable Growers
Association*

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

President

Brian Campbell '24
Berwick

First Vice President

Rita Resick '23
Somerset

Second Vice President

Peter Flynn '24
West Chester

Secretary-Treasurer

William Reynolds '22
Waynesboro

Past President

Jonathan Strite '22
Harrisburg

Directors

Tina Forry '22
Palmyra

Christopher Harner '23

State College

Barron Hetherington '22

Ringtown

Alan Kemmerer '22

Berwick

Arthur King '24

Valencia

Amy Metrick '24

Butler

Michael Orzolek '24

State College

Christopher Powell '23

Strasburg

John Shenk '23

Lititz

Robert Shenot '22

Wexford

Jeffrey Stoltzfus '23

Atglen

Mark Troyer '24

Waterford

Joel Weaver '23

Windber

Executive Director

William Troxell
Richfield

The History of Women in PVGA

With March being Women's History Month, we thought we would give a brief history of women's involvement in PVGA. The wives of PVGA members have always played an important role in their family farms, particularly those involved in direct marketing. In the late seventies, the Association began its Farm Show Food Booth and the wives of the directors helped run the booth each year. In 1978, the Association began holding their Pennsylvania Vegetable Conference with the State Horticultural Association of Pennsylvania's (SHAP) Annual Meeting in Hershey - the beginning of what would be come the Mid-Atlantic Fruit and Vegetable Convention. SHAP had a Women's Auxiliary organization and in 1979 the wives of some PVGA members discussed forming a PVGA Auxiliary also. However, it apparently never really flourished and by 1984 was not in existence.

In 1985 Myrtle Hetherington of Zion Grove was elected to the PVGA Board of Directors - apparently the first women to serve in that office. She served 12 years until 1996. She was also a second-generation director in that her father had served on the Board previously. Myrtle and her brother operated a fresh market wholesale vegetable farm in Schuylkill County.

From 1989 to 1992 Myrtle was joined on the Board by Wilma Heller of Bushkill. Wilma and her husband operated a roadside market vegetable farm in the Pocono's region before relocating to New York state.

Lois Klinger of Catawissa served as a director for 15 years, from 2001 to 2015, the longest tenure of any women on the Board to date. Lois and her children grow bedding plants and fresh market vegetables which Lois markets at home and at several farmer's markets in nearby Schuylkill County towns. She also is known at market for her home baked pies during the holidays.

In 2017, Rita Resick of Somerset was elected to the Board. The next year, in 2018, she was elected as Second Vice President - thus becoming the first women officer of the Association. Rita, along with her husband, sister and brother-in-law operate Laurel Vista Farms which focuses on wholesale production of potatoes, snap beans and sweet onions along with a line of value-added vegetable products sold online and to regional stores.

Rita was joined on the Board in 2018 by Amy Metrick of Butler and by Tina Forry of Palmyra in 2019, thus marking the first time there have been three women serving on the Board. Amy, along with her parents and sister, operate Harvest View Farm and Market where they grow a wide variety of bedding plants, fruits and vegetables and make their own cider which they sell through their roadside market and CSA. She is also a Penn State 4-H Extension Educator in Butler County.

Tina and her husband and children operate the Risser-Marvel Farm Market in Annville. They grow a variety vegetable crops for their retail farm market and also operate an agritainment corn maze in the fall. Tina is a past president of the Pennsylvania Retail Farm Association.



Amy Metrick



Rita Resick



Tina Forry



Lois Klinger

The **Pennsylvania Vegetable Growers News** is the official monthly publication of the
Pennsylvania Vegetable Growers Association, Inc.,

815 Middle Road, Richfield, PA 17086-9205

Phone and fax: 717-694-3596 • Email: pvga@pvga.org • Website: www.pvga.org

Our Mission:

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

Our Vision:

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

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

State News Briefs *continued from page 3*

used occasionally for weddings or other social events from some parts of the Uniform Construction Code, as long as other safety conditions are met. The exemption would apply only to existing structures, not new construction.

With more people wanting to connect with agriculture and hold events in rustic settings, wedding barns can be a great option for farms to diversify and bring in additional revenue to supplement farm income. However, some municipal governments have required farms that want to host events to retrofit historic barns and agricultural buildings to meet the entirety of the construction code, which can be cost prohibitive, especially if a sprinkler system is required.

The legislation would allow farms to avoid having to install a sprinkler system in existing buildings if they meet certain safety requirements. Those include: ensuring electrical wiring is up to date, ensuring there are sufficient and operational smoke detectors and portable fire extinguishers on site, prohibiting smoking and open flames (except for food-warming trays), and ensuring there are multiple ways to exit the building safely in an emergency.

The bill is based on agreements that some farmers have reached with local officials in their municipalities and would establish a statewide standard that makes it easier for farms throughout the commonwealth to host events safely.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, March/April 2021.

Protective Gear Bill Gets OK from House Committee

Legislation that would provide grants to help food processors equip their employees with personal protective equipment is moving forward in the General Assembly.

The state House Agriculture and Rural Affairs Committee voted unanimously to approve House Bill 179, sending it to the full chamber for consideration. The same measure, sponsored by Rep. Bridget Kosierowski of Lackawanna County, cleared the House unanimously last year but did not reach a vote by the Senate.

Pennsylvania Farm Bureau believes the measure would assist food processors with keeping their employees safe and maintain a critical link in the food supply chain. Closures of food processing operations due to COVID-19 outbreaks last spring led to significant supply chain bottlenecks that resulted in shortages of certain products at grocery stores while farmers were left with livestock and commodities they could not market.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, March/April 2021.

Deadline Approaching to Apply for Conservation Plan Reimbursements

Pennsylvania Department of Environmental Protection has more than \$530,000 still available to reimburse farmers in the Chesapeake Bay Watershed for costs associated with developing conservation plans.

But be sure to apply right away. Plans must be submitted by May 31, 2021 to be eligible for reimbursement.

The Agricultural Plan Reimbursement Program reimburses producers for the cost of hiring technical experts to develop Nutrient and Manure Management and Agricultural Erosion and Sediment Control plans. Plans developed after Jan. 1, 2019 are eligible. More than one plan may be submitted for reimbursement, for up to a maximum of \$6,000.

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

For additional questions, farmers in Bradford, Cameron, Carbon, Centre, Clearfield, Clinton, Columbia, Elk, Jefferson, Lackawanna, Luzerne, Lycoming, McKean, Montour, Northumberland, Potter, Schuylkill, Snyder, Sullivan, Susquehanna, Union,

Tioga, Wayne, and Wyoming Counties should contact Josh Glace of Larson Design Group at jglace@larsondesigngroup.com or 570.374.5700, extension 4011.

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

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, March/April 2021.

Pa. Counties Included in Disaster Designations for Drought, Frost and Freeze

Farmers in 28 Pennsylvania counties may be eligible for federal disaster relief to assist with losses due to one or more weather events in 2020.

There are 25 Pennsylvania counties included in a pair of disaster designations related to drought conditions that occurred last summer and fall. Meanwhile, six counties—including three that were covered by the designations for drought—were included in disaster designations related to frost and freeze last spring.

A Secretarial disaster designation from the U.S. Department of Agriculture means that eligible farmers in those counties will be able to apply for assistance from USDA's Farm Service Agency, including emergency loans.

Farmers in Armstrong, Blair, Cambria, Cameron, Center, Clarion, Clearfield, Clinton, Elk, Forest, Huntingdon, Indiana, Jefferson, Lycoming, McKean, Mifflin, Potter, Union, and Warren counties can apply for relief related to losses due to drought June 1, 2020, through Nov. 30, 2020. Farmers in Adams, Cumberland, Dauphin, Franklin, Perry, and York counties can apply for relief related to losses due to drought June 1, 2020, through Nov. 17, 2020.

Farmers in McKean, Susquehanna, Warren and Wayne counties, can apply for relief related to losses due to freeze and frost that occurred between April 1 and June 1, 2020. Farmers in Potter and Tioga counties, can apply for relief related to losses due to freeze that occurred between April 15 and June 1, 2020.

For more information about assistance, contact your FSA county office or visit farmers.gov/recover.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, March/April 2021.

Programs Available to Help Farmers Reduce Energy Costs

Several free programs are available to help farmers and agribusinesses identify how they can reduce energy consumption and improve their bottom line. There are several programs in Pennsylvania that offer free technical assistance to identify potential energy savings and/or help applying for grants to make energy upgrades.

DEP / Penn State Extension

Pennsylvania Department of Environmental Protection and Penn State Extension have launched a new energy assistance program for agricultural producers in Pennsylvania.

Utility bill analyses will be provided free of charge upon request. A utility bill analysis involves review of 12 months of utility bills to determine simple ways for saving energy, to ensure taxes and fees are correct, and to help you make sense of the charges on your bills.

Farmers, take advantage of this free service now by contacting Ed Johnstonbaugh, Penn State Extension, at exj11@psu.edu.

NEWS

State News Briefs *continued from page 4*

PennTAP

Pennsylvania farmers can conserve energy, reduce waste, cut costs and increase profits for their farms or agribusinesses with a free on-site or virtual energy assessment from Penn State's Pennsylvania Technical Assistance Program.

Participants will receive detailed evaluations and advice as well as assistance with grant applications to fund equipment upgrades, all at no cost.

From livestock barns to grain drying systems to maple syrup production equipment, PennTAP advisors are equipped to assess all your agricultural systems. Contact PennTAP today to schedule an assessment or learn more about PennTAP services at penntap.psu.edu.

Northampton Community College Technology Applications Center

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

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

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

From Pennsylvania Agricultural Alliance Issues Update, Farm Bureau, March/April 2021.

Nominations Open for 2021 Leopold Conservation Award

Nominations are now open for the 2021 Pennsylvania Leopold Conservation Award.

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

Sand County Foundation and national sponsor American Farmland Trust present the Leopold Conservation Award to private landowners in 22 states for extraordinary achievement in voluntary conservation. In Pennsylvania, the \$10,000 award is presented in partnership with The Heinz Endowments and Pennsylvania Farm Bureau.

Nominations may be submitted on behalf of a landowner, or landowners may nominate themselves. The application can be found at www.sandcountyfoundation.org/ApplyLCA.

The application deadline date is August 5, 2021. Applications can be emailed to

award@sandcountyfoundation.org. If mailed, applications must be postmarked by Aug. 5, and mailed to:

Pennsylvania Farm Bureau
c/o Joel Rotz
PO Box 8736
Camp Hill, PA 17001-8736

"Many farmers across Pennsylvania have poured their sweat and resources into practices that benefit the land, water and natural resources and climate because they believe that environmental stewardship and smart farming go hand in hand," said Pennsylvania Farm Bureau President Rick Ebert. "We are encouraging Pennsylvania farmers to showcase their dedication to stewardship and innovative approaches to conservation by applying for the 2021 Leopold Conservation Award."

The award will be presented at the Pennsylvania Farm Show in January. Pennsylvania's 2020 Leopold Conservation Award was presented to Ben and Sharon Peckman, who own and operate Slate Ridge Dairy Farm near St. Thomas in Franklin County.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, March/April 2021.

Webinar Series to Examine Energy Savings

Penn State Extension and the Pennsylvania Department of Environmental Protection are offering a free, lunchtime webinar series to help farmers learn more about options for improving energy efficiency.

The sessions will focus on strategies that farmers can implement to improve their bottom lines by reducing energy costs, while also benefiting the environment. Topics include solar power, information for new farmers, high-efficiency lighting, heating, biogas, analyzing utility bills and strategies specific to dairy and poultry operations.

The hour-long webinars will be held each Thursday at noon March 25 through May 6.

Learn more and register at bit.ly/farmenergyday.

**SEE VIDEOS OF SPRAYERS IN ACTION ON UPDATED WEBSITE!
NEW HYDRAULIC FOLD SPRAYER FEATURES
AIRBAG BOOM SUSPENSION!**



200, 300 & 400 Gal. Manual Fold • 300 & 400 Gal. Hyd. Fold

Ask us about the advantages of the front mount boom.

PENNS CREEK MFG.

1340 Broadway Rd., Winfield, PA 17889

570-837-1197

www.pennscreekwelding.com

BUILDERS OF DEPENDABLE ECONOMICAL VEGETABLE SPRAYERS

BIO 360

Biodegradable | Compostable Mulch Film®



Made from Mater-Bi



BPI Certification



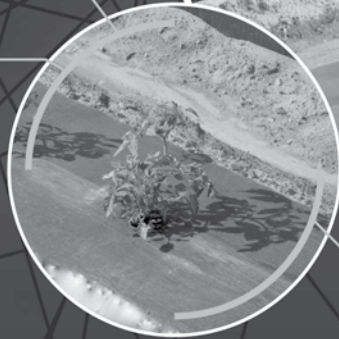
No negative impact on soil



Suitable for many types of crops



Several thicknesses available



Sustainably produced



Nolt's Produce Supplies
717-656-9764 - Leola, PA
noltsproducesupplies.net
For other regions, contact us
1-844-4BIO360 (1-844-424-6360)



NEWS

Time to Schedule Airblast Sprayer Calibrations

Keeping equipment up to date and working properly is important and sprayer calibration is one of the tasks that should be included in your maintenance schedule.



Photo: Bob Pollock, Penn State

Proper calibration helps make sure equipment is functioning properly and pesticide applications are getting to the target at the proper rate. Worn or broken nozzles or other equipment malfunctions can mean some areas of the target receive too much or too little pesticide, thus having a negative effect on pest control.

Watch these videos to learn the benefits of having your air blast sprayer calibrated from an educator's and grower's perspective:

Educator Perspective video

<https://www.youtube.com/watch?v=5kIXGYVlus4>

Grower Perspective video

<https://www.youtube.com/watch?v=MxOznfSbPYc>

To schedule your airblast sprayer calibration, please complete the Sprayer Calibration Request online form (PA residents only) at:

https://pennstate.qualtrics.com/jfe/form/SV_6EUxRr-rZf5eK6nr

If you have trouble signing up online, please call Kathy Branstetter at 814-863-0263.

Once requested, someone working with our office will be contacting you within a week or so. For us to be as efficient as possible, we have developed a PRE-calibration YouTube video to help you prepare your sprayer(s) prior to our arrival. We also have a link below for a PRE-calibration checklist that you can download and complete. The last link below shows an example of the calibration process.

General Pre-Calibration Instructions video

<https://www.youtube.com/watch?v=4LnOM-J7ApA>

Pre-Calibration Checklist

<https://extension.psu.edu/air-blast-sprayer-pre-calibration-instructions>

Calibration Process video

<https://www.youtube.com/watch?v=fF3TPvH0cHk>

Completing the pre-calibration checklist prior to our visit will help ensure a successful calibration. Please note: To avoid additional charges, prepare your sprayer prior to our arrival. Also, due to the condition of an unprepared sprayer, sometimes calibration must be delayed until a future date when it is in its proper operating condition.

We normally charge a fee for this educational demonstration program; however, due to COVID-19, we are suspending any charges for 2021. Normally, the grower portion of the sprayer calibration cost is \$50 for the first sprayer and additional sprayers are each \$30.

If you have any questions, please contact Bob Pollock at rcp3@psu.edu or Kathy Branstetter at 814-863-0263.

Additional Calibration Resources

The second edition of Airblast 101 – Your Guide to Effective and Efficient Spraying is now available at <https://sprayers101.com/airblast101/>. This new edition explores international best practices, describes new equipment, and explains the physics of spraying. It is an invaluable resource for farmers, equipment manufacturers, researchers, regulators, and educators in the field of agricultural spraying. Additionally, their website, Sprayers 101, <https://sprayers101.com/> is a great resource describing best practices in safe, efficient, and effective agricultural spraying.

Mr. Pollock is a Penn State Extension Educator in Indiana Co. From Penn State Extension, <https://extension.psu.edu/time-to-schedule-airblast-sprayer-calibrations>, March 2, 2021.

TEW MANUFACTURING CORP.

Fruit & Vegetable Cleaning & Sizing Equipment & Parts

Quality Latex & Poly Sponge Rubber Drying Donuts

Tuff Foam® Protective Padding

Brushes • Bearings • Sizing Chains

Belting • Scrubber Rubber

New Stainless Steel Machines

CALL TOLL FREE 800-380-5839 FOR CATALOG & PRICES

TEW MFG. CORP.

585-586-6120

P.O. BOX 87

FAX: 585-586-6083

PENFIELD, NY 14526

www.tewmfg.com

NEWS

Hurry Up and Wait: AEZ Modification Has Been Suspended

James Harvey



During the winter meeting season, we talked about the Application Exclusion Zone (AEZ) modification and that it became effective as of December 29, 2020.

For those who heard these sessions, you will recall that we told you that despite the modification not much has changed. Due to drift regulations, you still cannot allow spray to fall on humans. We have just been

notified that the Application Exclusion Zone (AEZ) modification has been suspended due to pending litigation. For the time being, all AEZ rules are reverting to the original requirements of the 2015 Worker Protection Standard revision. We will let you know when this situation is resolved.

While we are talking about the Worker Protection Standard (WPS), we are still seeing a lot of outdated WPS materials out there that needs to be replaced. If you are inspected for the WPS, you can be written up for not having the updated materials. Please check all of your Safety Data Sheets (SDS) to be sure that they are not the old Material Safety Data Sheets.

If you are using Penn State WPS training DVDS please look at the bottom of the DVD and there should be a 2018 on the very bottom if it is the updated version.

If you are using our flash drive, you have the updated material.

If you want to check your WPS poster, the Penn State poster will have May 2018 on the very bottom of the poster.

Our Worker training handbook will have a statement at the very bottom that the handbook is consistent with the 2015 Worker Protection Standard.

As always if you need WPS materials or help contact Jim Harvey at jdh18@psu.edu or call him at 814-863-8656 Mr. Harvey is a Penn State Educational Program Specialist. From Penn State Extension, March 11, 2021.

ProducePackaging.com[®]
for all your produce packaging needs

1-800-644-8729

Kurt Zuhlke & Assoc., Inc.
P.O. Box 609, Bangor, PA 18013



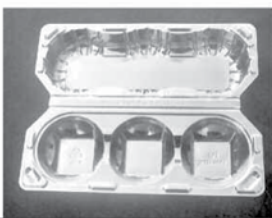
Over 45 Years In The Industry

For over 45 years, Kurt Zuhlke & Assoc., Inc. has been a part of the many innovative packaging concepts utilized by the produce industry.



High Quality Products And Services

Our packaging is designed to protect produce, provide excellent visibility to the consumer, reduce shrinkage and enhance the product. We also offer professional labeling design and application.



From Farmers To Repackers

Whether you are ordering a case or a truck load, you can rest assured that we have the ability and capacity to service your orders quickly.



VEGETABLE PRODUCTION

Pumpkin Session at the 2021 Mid Atlantic Fruit and Vegetable Convention

Thomas Butzler

Every year, the Mid Atlantic Fruit and Vegetable Convention has an educational session that is devoted to pumpkins.



Pumpkin field. Photo: Tom Butzler, Penn State

Although the convention was not held in the traditional gathering at Hershey, it was conducted in a virtual format. And yes, a pumpkin session was held. Below is a synopsis of the four presentations.

Management Considerations: Downy Mildew and Plectosporium Blight on Pumpkin

Dr. Beth Gugino, Penn State University, started off her presentation with an overview of cucurbit downy mildew identification and life cycle, important to understand these two items to differentiate between other diseases and target the organisms at the critical spread and infections points. It was interesting to note her comment on the ability to spread on air trajectories where it can "move 100s and 100s of miles." With an understanding of life cycle and spread issues, this then led to the idea of forecasting the risk of cucurbit downy mildew development. For the forecast system to be effective, monitoring for source locations on the east coast is necessary. This is accomplished on multiple fronts;

- Sentinel plots on the east coast (about 70 sites with a number of different cucurbit hosts; cucumber, muskmelon, jack-o-lantern pumpkin, giant pumpkin, accord squash, butternut squash, watermelon)
- Confirmations through Plant Disease Clinics of various Land Grant Universities
- Stakeholder reports (this includes extension educators, consultants, ag service providers.)
- Citizen Scientists/Master Gardeners

All of this information is located on the Cucurbit Downy Mildew Forecast site at <https://cdm.ipmpipe.org/>. This site can be visited at your convenience or you can sign up for email/text alerts.

To illustrate how this forecasting system works, Dr. Gugino then walked participants through the 2020 growing season with a series of maps. Starting on June 10, she showed reports on sources of downy mildew on cantaloupes in Georgia and on cucumbers in South and North Carolina and how this spread up into the mid-Atlantic region in the following months.



Downy mildew in a pumpkin field. Photo: Tom Butzler, Penn State

Over the years, research has shown that different strains (referred to as clades) of the downy mildew pathogen attack different cucurbits. Clade 1 has adapted to squash, pumpkin, and watermelon while Clade 2 targets cucumber and cantaloupe. The Cucurbit Downy Mildew Forecast system will show growers what organism is predominate and on the move. This then allows growers to develop crop-specific management practices.

Why is this so important? It could save a grower money!

In 2020, only Clade 2 was found and reported in Pennsylvania, yet growers were applying downy mildew fungicides on pumpkin (a favorite of Clade 1). Those fungicide applications for

Refrigerated and Ventilated Cooling Systems for Fruit and Vegetable Storages

- COMMERCIAL REFRIGERATION
- DESIGN, SALES AND SERVICE
- SERVING AGRICULTURE FOR OVER 70 YEARS

Free Consultation and Quote

Call Mike Mager at 585-343-2678

ARCTIC

REFRIGERATION CO. OF BATAVIA

26 Cedar Street, Batavia, NY 14020

www.arcticrefrigeration.com

VEGETABLE PRODUCTION

downy mildew could have been avoided (powdery mildew is a different story). Stay tuned for the 2021 growing season by utilizing the Cucurbit Downy Mildew Forecast.



The presentation also covered cucurbit downy mildew fungicide recommendations. Special attention was paid to the issue of their use with the two Clades.

The second half of her presentation covered Plectosporium blight, a fungal disease that has been sporadic in the past but was more prevalent in 2020. Growers might not be as familiar with identification and time was spent on foliar symptoms (small, white diamond-shaped lesions on leaf petioles and veins on the underside of the leaf) and fruit symptoms (small, round white lesions that can coalesce that can form a plague). A good overview of management strategies was also covered.

It All Started with Pumpkins and Strawberries

Every year, we conduct a survey at the MAFVC. One comment that appears every year is the need for more growers to present information about their operations. While it is important for producers to hear information on the latest research (i.e., see write-up above) growers love to hear from other growers. Because of this request, the pumpkin session always has a pumpkin producer in the speaker lineup.

This year's feature was Bruce Hellerick, of Hellerick's Family Farm. Bruce gave an overview of the 200+-year-old farm from its start in 1794 to today. During this introduction, he talked about the start of pumpkin production on the farm. The pumpkin aspect of the farm started around 1979 with college looming. "We needed to try to figure out how to make some more money and mom and dad said let's put in some strawberries and pumpkins and see how it goes", said Bruce. That initial foray was successful, and the rest of his presentation looked at how the operation has evolved into today's destination for tens of thousands every year that includes corn mazes, goat yoga, sunflower photo ops, and aerial adventures. And of course – pumpkins! Visit Hellerick's Family Farm website at <https://hellericksfarm.com/> to get a glimpse of activity on the farm.



(Left) Pumpkins are a mainstay in the Hellerick Family Farm fall farm festivals. (Right) Hellerick Farms has expanded beyond just pumpkins to include numerous entertainment options such as their aerial adventure park. Photos courtesy of Hellerick's Family Farm

Continued on page 12



Seed and Service

Stokes Seeds offers a comprehensive product line from world-class suppliers for commercial growers of all sizes.

Stokes Seeds provides grower-specific seed prescriptions to meet growers' production and profit goals.

Stokes Seeds' Pennsylvania Seed Consultants



Tom Pagels
609-247-7140

tpagels@stokeseeds.com



Tom Dauria
908-489-4896

tdauria@stokeseeds.com



Blake Myers
585-303-3252

vegetableseeds@aol.com

— Quality Seed Since 1881 —

800-962-4999 | www.stokeseeds.com | 13031 Reflections Dr Holland MI 49424

VEGETABLE PRODUCTION

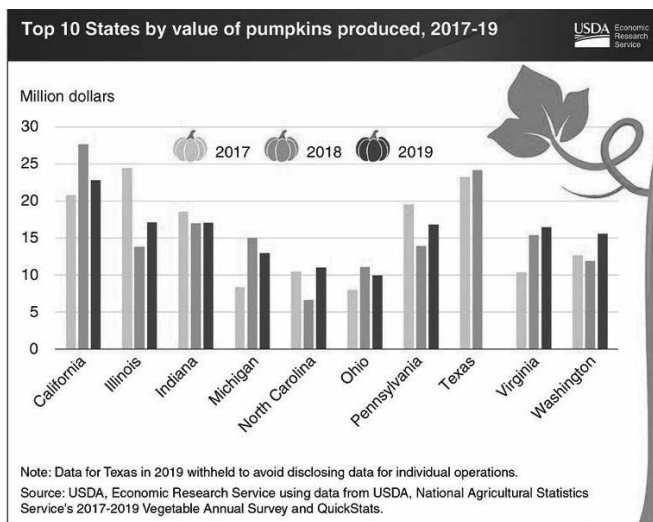
Pumpkin Session at the 2021 Mid Atlantic Fruit and Vegetable Convention

continued from page 11

Review of Weed Control in Pumpkins

Every year, updates are given on insecticides and fungicides for pumpkin production. And no wonder as new products are rolled out on a regular basis. Unfortunately, the same cannot be said of herbicide options as new products are much more limited. But that is not to say, an herbicide talk is not important. A good review strengthens our knowledge base for the upcoming battle against weeds.

Dwight Lingenfelter, Penn State University, started off his presentation with an overview of Pennsylvania's ranking in the US on pumpkin production. His point was to illustrate the importance of this crop in the state, hence the need for good management decisions.



Pennsylvania's standings in pumpkin production. <https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=99689>

Dwight quickly dove into a quick review of soil-applied herbicides (pre-emergent) and what was allowed by the label, to use on pumpkin, watermelon, and cantaloupes. As an example, Reflex is labeled on pumpkin but not watermelon, and cantaloupes whereas Sinbar is only labeled for watermelon. This was followed by post-emergent option tables.

A couple of key points on specific herbicides during his presentation:

For burndown of weeds or cover crops in a no-till setting, allow at least 5-7 days between application of glyphosate and planting. Paraquat is also an option before planting but a second application may be required for complete control. Be aware that special training is needed before mixing, loading, or applying paraquat. But exciting news on a new potential burndown product for pumpkins! Liberty/glufosinate, currently not labeled, has IR-4/BASF/EPA looking at label change.

Curbit 3EC (ethalfluralin) can be used in plasticulture but only in the row middles. Regardless of plastic or bare ground, a half-inch of water (rainfall/irrigation) is needed to activate the product.

Command 3ME (clomazone) is a tricky one. Dwight pointed out that the label allows for use on winter squash and processing pumpkins but not jack-o-lantern pumpkins.

Dwight did point out that Strategy, a combination of Curbit and Command, is labeled for use on jack-o-lantern pumpkins.

Be aware of the pre-emergent Dual Magnum 7.62EC label. While it is labeled for pumpkins, it is not for broadcast application but either a row middle application for plasticulture or applied

bare ground as an inter-row or inter-hill spray, leaving 1 foot of untreated area over the row. Research is underway to see if that limitation can be removed and early results are promising.

Reflex2L is labeled for pumpkins but only in Delaware, Maryland, New Jersey, Pennsylvania, and Virginia under a 24(c) label. Applicators will need to sign a waiver of liability at <https://www.syngenta-us.com/labels/indemnified-label-login>. In addition, not all pumpkin varieties are tolerant of Reflex.

Sandea 75DF (halosulfuron) can be used both pre- and post-emergence. Read the label as there are some crop rotational issues and restrictions with organophosphate insecticides.

Prowl H2O is not labeled for use in pumpkins, including row-middle applications.

Grass herbicides Select/clethodim and Poast typically are used with crop oil concentrates but be aware of crop injury when hot or humid. Might want to switch to nonionic surfactant in those conditions.

Hooded sprayers are a must to protect vines and direct the spray to weeds in row middles with products such as Gramoxone 3SL/paraquat or Aim 2EC (carfentrazone).

Dwight finished up the presentation with a review of some problematic weeds in vegetable crops; Palmer amaranth, waterhemp, and glyphosate-resistant horseweed/marestail.

Integrated Pest and Pollinator Management (IPPM) in Pumpkins

Dr. Shelby Fleischer, Penn State University, started off with an explanation on why we have gone from IPM (Integrated Pest Man-

MRS AIR BLAST SPRAYER

5 X 5 Spray Head
Sprays 12-15 Ft.
on both sides

- > 23 HP Vanguard engine
- > Electric start
- > 60 gallon tank
- > Trailer hook up
- > Electric diaphragm pump

PRODUCED BY

27 W Mohler Church Rd. Ste
1 Ephrata, PA 17522
717-733-3015

VEGETABLE PRODUCTION

agement) to IPPM (Integrated Pest and Pollinator Management) in regard to pumpkin pests and the pollinators that are required for pollination to occur.

Much time was spent on the striped cucumber beetle as it is the first insect of major concern in the growing season. The beetles can transmit the organism that causes bacterial wilt as they feed. The overwintering adult beetles will typically move into the area before cucurbits are even planted and are nearby when pumpkins emerge from the soil. Seeds treated with Farmore (neonicotinoid) give control of beetle feeding for about 3 weeks. Afterward, efficacy starts to fade. He pointed out that these newer products are much safer for farm labor than some of the traditional insecticides such as pyrethroids and carbamates. Shelby then explained that the best way to use neonicotinoids was through seed treatment as very little of the material was expressed in the pollen as compared to transplant water and dips.

He then explored some alternatives to insecticide usage. A perimeter trap crop of 'Blue Hubbard' can draw the beetles away from the desired crop. Trials are being conducted with baits and pheromones to see if they provide a level of control.

Of more concern with the cucumber beetles is when the crop is flowering. Pumpkins seem to be a little more tolerant at this stage to bacterial wilt, not so much with other cucurbits such as cucumber and melons—although late season rind feeding can be of concern for ornamental pumpkins. If using insecticides remember to minimize risk to bees from foliar sprays by avoiding systemics that are toxic to bees, spraying after flowers close, limiting residue on pollen and nectar, and avoiding tank-mixes with fungicides that synergize bee toxicity.

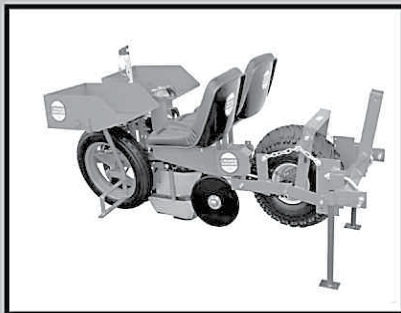


Striped cucumber beetle control is tricky when pumpkin flowers are open because of pollinator concerns. Photo: Tom Butzler, Penn State.

Around mid-July, the squash bug starts to show up. This vectors a bacterium that causes yellow vine decline and should be managed to prevent loss. Shelby reviewed some labeled insecticides, such as flupyrifidifurone (Sivanto), that are less toxic to pumpkin pollinators than other labeled products.

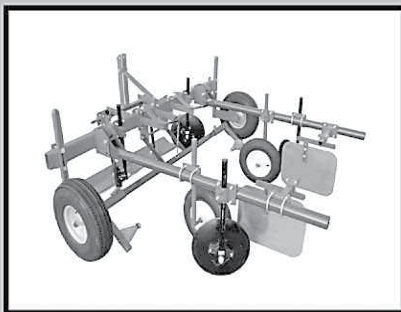
Continued on page 14

MECHANICAL TRANSPLANTER COMPANY



Model 1000

- * Excellent for bare root and small cells. Our most popular transplanter.



Model 90

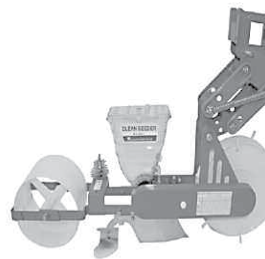
- * Lays any size mulch from 3-6 feet wide.

NEW CLEAN SEEDER



MODEL JP-1

- * Excellent for small seed
- * Lightweight & easy to handle
- * Accurate spacing



MODEL JPH

- * Row spacing as close as 7"
- * Mounts on 2" square toolbar

Mechanical Transplanter Company, LLC * 1150 Central Avenue * Holland, MI 49423

Phone: 616-396-8738 or 800-757-5268 * Fax: 616-396-3619

website: www.mechanicaltransplanter.com * e-mail: mtc@mechanicaltransplanter.com

VEGETABLE PRODUCTION

Pumpkin Session at the 2021 Mid Atlantic Fruit and Vegetable Convention

continued from page 11



Squash bug: adult (center) and nymphs (left) of the squash bug. Photo: Tom Butzler, Penn State

Shelby did explore a beneficial that might be playing a role in squash bug control. In work done by Dr. Tom Kuhar of Virginia Tech, he was able to show a native egg parasitoid that parasitized 70-80% of eggs in a Virginia study.

The question was asked to participants "Are wild bees sufficient and reliable pollinators of pumpkin in Pennsylvania?" This allowed Shelby to delve into a multi-year research project in over 24 fields. The study showed that 37 species of bees coming into commercial pumpkin crops, but visitation rates were overwhelmingly being driven by honey, squash, and common eastern bumble bees.

The wild bees (squash and bumble) are high pollen contributors to Pennsylvania pumpkins. Some of Dr. Fleischer's bumble bee research over 4 years and 30 fields showed that 291 to 829 colonies send foragers into pumpkin fields, regardless of size. Not to leave squash bees out of the mix, he stated that they are much

higher in situations where they are near to cucurbit crops of last year. An in-depth look at the squash bee can be found at Biology & Pollination Services of the Squash Bee at <https://lopezuribelab.com/squash-bee-biology/>. The publication will cover foraging and nesting behavior, range, and conservation. Great photos and graphics make it an easy read.



Top left, squash bees are effective pumpkin pollinators. Notice the pollen on the bee's leg. Bottom left, squash bee holes (circled) in a cucurbit field. Right, the new Penn State Extension's Biology & Pollination Services of the Squash Bee is a wealth of information in an easy-to-read publication.

Mr. Butzler is a Penn State Extension educator in Clinton Co. From Penn State Extension, <https://extension.psu.edu/pumpkin-session-at-the-2021-mid-atlantic-fruit-and-vegetable-convention>, March 9, 2021.

Time to Prepare for Protecting Allium Crops From Allium Leafminer

Timothy Elkner and Shelby Fleischer

Allium leafminer is an invasive leafmining fly from Poland first detected in Lancaster County, Pennsylvania in December 2015.

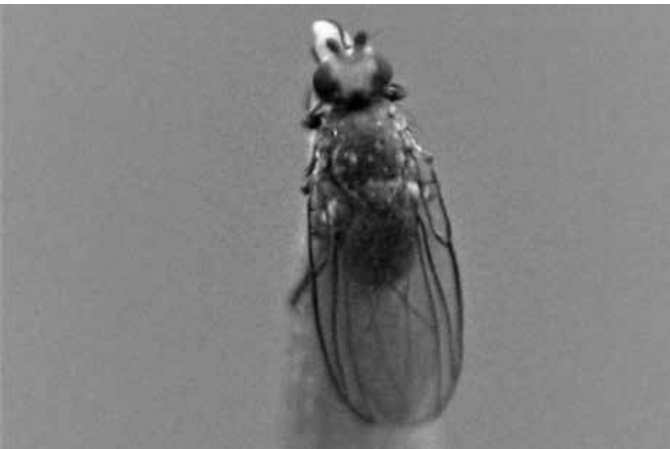


Figure 1. Adult Allium leafminer.

Allium leafminer (ALM) attacks plants in the Allium genus including onion, garlic, leek, scallions, shallots, and chives (Figure 1.) It overwinters as a pupa in leaf tissue or adjacent soil, emerges in the spring, and adult flight occurs over a 4-to-5-week period. Females puncture leaves with their ovipositor and both males and females feed on leaf sap. Oviposition results in a characteristic linear series of round wounds (Fig. 2) which is unlike any other insect damage in allium crops in our area. Larval development progresses to the pupal stage but is then delayed as the pupa undergoes summer aestivation, and they do not emerge again until late September for another 5-7-week flight.

Knowing when adults start flying and laying eggs helps with management. You can protect crops by applying netting prior to flight and removing it after flight-period ends. Flight periods have been about 5-7 weeks (to be safe, remove netting about 8 weeks after flight starts). Another control option is to apply insecticides during the flight period, targeting adults and developing larvae. Systemics tend to work best because the larvae are mining inside

VEGETABLE PRODUCTION

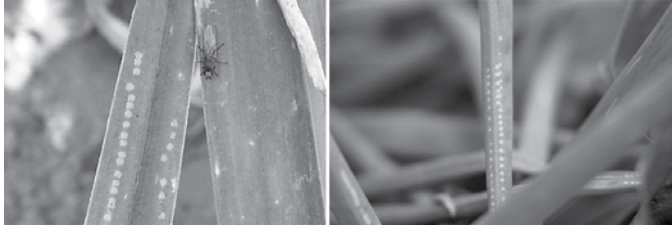


Figure 2. Left: Allium leafminer fly and feeding damage on leek leaf showing adult size. Right: Allium leafminer feeding damage on onion leaves. Photos: Tim Elkner, Penn State

the leaf tissue. Since Allium leaves are very waxy, a surfactant is recommended whenever applying insecticides to these crops. Based on several years of research trials, the highest and most consistent control of ALM occurred using foliar applications of dinotefuran (Scorpion), cyantraniliprole (Exirel), and spinetoram (Radiant), and spinosad (Entrust) among OMRI-labeled options. Those trials used weekly applications. Preliminary data suggest fewer applications are as effective, but we don't yet have good data about what schedules will work best.

But when to start—with nets or insecticides—is a question we are often asked by growers. With the support of the Pennsylvania Vegetable Growers Association (PVGGA), we scouted throughout the southeast and central Pennsylvania in early spring and combined that with lab work and scouting data from New York to develop a degree-day model for predicting when the first emergence will occur. We estimate that spring ALM first emergence occurs after a degree-day accumulation of 350°D above a threshold of 1°C, starting from January 1. In the State College area, this was when daffodils and forsythia had been blooming for about a week, and ornamental pear was in bloom in urban areas.

Using FAA data from Lancaster, PA, as of March 25, 2021, the degree-day accumulation above 1°C since January 1 is 208, which is 142 degree-days short of predicted emergence at 350 degree-days. During the last week, there has been an average of 8.2 degree-days per day. Assuming this will increase to about 10 per day, we will reach 350 in about 14 more days, or two weeks. So, a rough estimate for predicted emergence in the Lancaster area is April 8, or sooner. This is in the ballpark of when first emergence occurred in the last few years (Table 1) which has ranged from the 17th of March to the 27th of April. Of course, this is just the best guess. In years with a very warm winter, we saw some exceptionally early initial emergence, about 10 days before our prediction, but most of the population emerged much closer to

our prediction. Also, our current model uses a statistical method that gives a range of what might be the best lower threshold and degree-day accumulation requirement. Further work is needed to refine these parameters.

Regardless of our modeling caveats, now is the time to start scouting your Allium crops and prepare for management, if needed. Finding adults is easiest in the cool temperatures of early morning and looking at the tops of the leaves. Finding the feeding scars on leaves is often easier than finding adults, especially on onions, and when scouting during windy conditions. Most of our first detections were in wild garlic, or other weedy alliums, along fence lines or forested borders of farms. Among Allium species, we tend to find more ALM in early spring scallions and green onions so that is also a great place to search.

Table 1: Date of first detection of ALM adults or feeding/oviposition wounds in 2019 and 2020.

2020	
State College, PA	13-Apr
Landisville, PA	17-Mar
Landisburg, PA	18-Mar
York, PA	17-Mar
Hanover, PA	17-Mar
Rock Springs, PA	14-Apr
Millheim, PA	14-Apr
Aaronsburg, PA	14-Apr
Woodward, PA	14-Apr
Lawrenceville, NJ	24-Mar
Milford, NJ	25-Mar
Hudson Valley, NY	8-Apr
2019	
Landisville, PA	18-Apr
Pottstown, PA	18-Apr
Landisburg, PA	16-Apr
Millheim, PA	27-Apr
Woodward, PA	27-Apr
Aaronsburg, PA	27-Apr
Huntington, PA	24-Apr

Dr. Elkner is with Penn State Extension in Lancaster Co. and Dr. Fleischer is with the Dept. of Entomology at Penn State Univ. From Penn State Extension, <https://extension.psu.edu/time-to-prepare-for-protecting-allium-crops-from-allium-leafminer>, March 26, 2021.

March Special

Fertrell Green Potash

Concerned About Low Potassium?

We couple zeolite and our very own help source to provide your plants with ample amounts of potassium and soil conditioning power!

It will feed your plants adequate potassium all season long!
***10% off through March 31st**

Contact your local Fertrell Rep. or Fertrell's main office to get further information on Green Potash. *Restrictions Apply

75TH ANNIVERSARY



SINCE 1946
Better Naturally!

**PRODUCER OF NATURAL & ORGANIC
FEED SUPPLEMENTS & FERTILIZERS**

CALL FOR A COPY OF CATALOG: 800-347-1566 | WWW.FERTRELL.COM

VEGETABLE PRODUCTION

High Tunnel Planning and a Few Reminders for High Tunnel Tomato Growers

Rose Ogutu

The cold months are over and you are probably thinking in terms of the major 3 planting cycles for your high tunnels: early spring, summer and early fall. It is always a good idea to prevent pathogens and insects from overwintering.

Tomatoes still remain the number one crop in high tunnels in Delaware. Transplanting dates are approaching for growers who intend to hit the early market. Target the dates of transplanting to be 2-4 weeks before field planting. The average last frost dates are May 1 to May 10th. Seeding dates are normally 5 weeks prior to transplant dates. Transplants need to be hardened off before planting. If you are into growing grafted tomatoes, note that the grafting process will delay the seedling growth for 6 to 7 days, pushing your start date even earlier. Get in touch with your local Extension office for updates on varietal trials and recommended varieties. Local supplier of seedlings normally have great information and can provide guidance on choice of variety.

Varietal Selection

Your choice of variety is very crucial. Remember that the determinate varieties (60 to 75 days to maturity) are best for a quick early crop while indeterminate varieties produce all summer long. Determinate varieties form bush type plants that are more compact than indeterminate ones and are easier to support and contain. They ripen over a concentrated time period usually producing one or 2 main harvests. BHN 589, Primo Red, Scarlet Red and Mountain Fresh Plus are popular determinate varieties. There exist hundreds of tomato varieties in the market today. When choosing wisely, consider, yields, flavor, disease resistance and training needs. A number of varieties bred for greenhouse/high tunnel conditions also perform well in the open field conditions. Make the right choice because high tunnels have 20% less light than outdoors. As much as possible, avoid varieties with a vigorous growth habit and instead go for plants that have 'tidy-growth habit which is more regular', smaller leaves and fewer suckers.

High Tunnels help keep rain off the foliage, eliminating a number of fungal and bacterial diseases. Aphids, Spider mites, leaf mold, grey leaf spot and powdery mildew remain a challenge on sheltered tomato plants because of the high humidity and conducive temperatures. Verticillium, Nematodes, Fusarium, and Corky Root Rot are soil borne diseases which can be avoided by not growing on the same spot year after year. Problems associated with monoculture can be avoided by switching from growing in the soil to using media bags.

Other Considerations

For sturdy tomato plants, prepare a bed which is deep and well-draining. Spacing depends on varieties and trellising method. 30 inch raised inch raised beds can accommodate plants spaced 18 inches apart on Florida weave trellising- and double row spacing of 24 in staggered plants.

Always monitor plants in high tunnels. Close the high tunnels in the afternoon to capture peak heat. Consider using row covers to further protect plants from cold damage. Once nighttime lows are forecasted to be 50 °F or higher, leave the high tunnel open or vented to avoid unnecessary leaf moisture.

Tomatoes have the best nutrient uptake when the soil pH is 6.2 to 6.5.

Avoid episodes of fruit cracking by managing irrigation well during fruit development.

Slower release fertilizers such as greensand as a potassium source and aragonite as a calcium source applied at plow down have demonstrated high potential to further reduce Blossom End Rot and Yellow shoulder.




Scouting an early tomato crop 'BHN 589' in a high tunnel in Sussex County. Note the additional protection from row covers.


References


<https://www.udel.edu/content/dam/udellimages/canr/pdfs/extension/sustainable-agriculture/vegetable-trials/TomatoVarietyTrial2019.pdf>

Ms. Ogutu is the Horticulture Specialist at the Delaware State Univ. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 29, Issue 1, March 5, 2021.

Since 2001 Authority in Refrigeration for
Agro-Industrial Applications in North America.










- Thru the Wall
- Portable
- Roof Mounted
- Hydrocoolers
- Custom Designs
- Blast Freezers
- Chillers
- Greenhouse
- Coolers



1.866.748.7786
info@kooljet.com

Herbicide Carryover Could Impact Where You Site Your High Tunnel

Thomas Ford

New entrants into the art of high tunnel growing are often looking to site their high tunnels in fields that contain their most productive soils.



Photo: Tom Ford, Penn State

While this is a good practice it can present some unique challenges if the high tunnel is going to be erected in a field that recently grew an agronomic crop like corn.

Herbicides are used routinely on most farms and farmers carefully plan their agronomic crop rotations around the stated restrictions or guidelines that appear on the pesticide label. When a high tunnel is to be erected in a cornfield the farmer or grower may not be cognizant of the rotational restrictions that are to be followed when a high-value horticultural crop is to be grown.

On a recent visit to an area vegetable grower, we looked over a cornfield that had just recently been cut for silage. The soils were deep, the land was relatively level, and the field was located near his water source so irrigation could be easily deployed. When I asked the grower about the herbicide history for the site, he indicated that he thought that the herbicide atrazine may have been used in the field, but that he would have to check with another family member. The next day the grower shared with me that atrazine, metolachlor, and rimsulfuron had been applied to the cornfield.

A review of the herbicide labels revealed that the rimsulfuron product required an 18-month restriction on planting vegetable crops. A review of the atrazine plus metolachlor label revealed that a full two years needed to elapse before the soils in that field could legally be planted with vegetable crops like tomatoes.

Pesticide labels are the law and in this case, the label is trying to prevent growers from making a serious mistake that could result in crop failure due to herbicide carryover. Atrazine is a very persistent photosynthetic inhibitor that can remain in the soil for a relatively long time. Atrazine's persistence in the soil is dependent upon rainfall, soil pH, and even microbial activity. Under certain environmental conditions, atrazine can experience enhanced degradation in fields when it has been used continuously, but even if the chemistry does degrade more quickly, you are still bound by the restrictions on the pesticide label.

Growers often ask Extension Educators if they can test the soils where herbicides have been applied to "clear" the field for planting high-value horticultural crops. There are private labs that can test for herbicide residues, but variability in field soil conditions and plow depth can impact the accuracy of these results.

One grower that I worked with years ago was intent on planting an area that had been planted in corn the year before. He contracted with a private lab to test for residues and thought that he was safe to plant his strawberries when the returned test results appeared favorable. After planting the strawberries, some of the

plants became chlorotic in appearance and did not establish very well due to atrazine carryover in a few sections of the field.

Another grower wishing to defy the label conducted a bioassay in which he took soil from the field at varying depths and filled several flowerpots and planted snapbeans in each pot. This grower also filled two flowerpots with soil from an alfalfa field that had not been treated with an herbicide in the past four years. He planted snapbeans in these two control pots as well. The pots were watered, and the beans sprouted and emerged in each pot which gave the grower some hope. As the first true leaves emerged from each plant the grower started noticing a pronounced yellowing and then browning on the bean plants planted in the soils where herbicide carryover was expected. The snapbeans in the control pots grew vigorously and even began to flower, while the other snapbean plants were essentially stunted, chlorotic, and in some cases even dead.

This simple bioassay cost this grower very little to administer but provided him with the answer he needed. As a result, the grower decided not to plant this specific field with vegetable crops or cut flowers and instead opted for another year of corn. The grower elected to use glyphosate-tolerant corn the next year which allowed him to plant vegetable crops the following year with no fear of herbicide carryover.

If you are a beginning vegetable or cut flower grower, or a seasoned professional, carefully consider the field history before developing a cropping plan. Herbicide carryover is a real threat so review each herbicide label carefully so you don't lose your next crop to herbicide injury.

Mr. Ford is a Penn State Extension Educator in Cambria Co. From Penn State Extension, <https://extension.psu.edu/herbicide-carryover-could-impact-where-you-site-your-high-tunnel>, October 16, 2020.

HOW TO USE ASPARAGUS

Check your way through the bounty that Pennsylvania has to offer. Share your story with others - tag #paveggies.

WRAP IN BACON

Or prosciutto! Or salmon! Just wrap and roast in the oven until tender and slightly crispy.

NOODLES

Use a vegetable peeler to carefully create long, thin ribbons and enjoy like a noodle.

FOLD INTO EGGS

Just chop and quickly saute before pairing with silky scrambled eggs or a savory quiche.

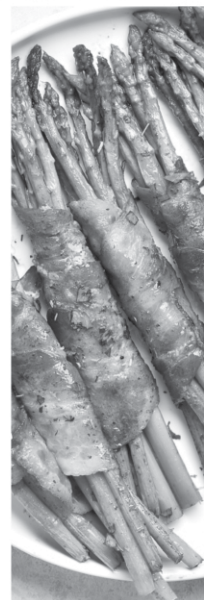
ON THE GRILL

Asparagus is divine when heated but not overcooked and the grill is a great way to achieve this.

PICKLED

Asparagus have a wonderful texture for pickling. They don't need to be cooked or blanched. Just jar 'em!

MORE TIPS, TRICKS & RECIPES: PAVEGGIES.ORG



An example of free vegetable promotion graphics from the Pennsylvania Vegetable Marketing and Research Program for your use in ads, signs and social media - available free at <https://www.paveggies.org/farmers/farmers-toolkit/graphics/>.

VEGETABLE PRODUCTION

Using Growing Degree Days to Schedule Sweet Corn

Gordon Johnson

Sweet corn is one of the most important fresh market vegetable crops in the region. Direct market growers and wholesalers strive to have a continuous supply for their customers during the growing season.

Some growers will make a planting and then wait until that corn has emerged to make the next planting while others use their experience to create a calendar or determine when to plant.

With sweet corn, maturity will be based largely on two factors: the variety grown, and the amount of heat accumulated. There can be other factors that delay maturity such as crop injury, flooding, or hail; however, the genetics and temperature will be the major drivers.

To ensure a steady supply of sweet corn, the most accurate way to space plantings in the spring is by the use of growing degree days.

Growing Degree Days (GDD) are calculated as follows $GDD = ((\text{Maximum Temperature} + \text{Minimum Temperature})/2) - 50^\circ\text{F}$. So, if the daytime temperature is 68 and the nighttime temperature is 48, you would add $68+48=116$ then divide $116/2 = 58$ and then subtract $58-50= 8$ GDD. Negative numbers are not counted. You can find growing degree days already calculated for nearby weather stations at this DEOS site: http://www.deos.udel.edu/data/agirrigation_retrieval.php

To schedule sweet corn by growing degree days you will need the following information:

- 1.) How much corn you plant to sell per day and the number of acres or row feet to plant to supply that amount,
- 2.) How many days you expect to harvest from that planting (1-4 days usually),
- 3.) The GDDs required to harvest for the varieties of sweet corn that you grow (an alternative is your records of the first harvest for the varieties you use),
- 4.) The average GDDs during the expected harvest period,
- 5.) GDDs during your planting season (calculate daily). Having your own maximum and minimum thermometer is the best way to do this. Information from the nearest weather station is an acceptable alternative.

So, for example, you have determined that you need 200 dozen ears per day. This requires 2400 ears or about 3000 seeds accounting for germination losses and unmarketable ears. At 24000 seeds per acre this is 0.125 or $\frac{1}{8}$ acre and if you plan to harvest over three days this would be 0.375 or $\frac{3}{8}$ acres to plant.

Historically, your records indicate that the specific variety you plant April 10 matures July 1. Or you can use historical GDD information and GDDs for that variety from your seed supplier to calculate first harvest (a 1300 GDD corn will mature on average between July 1 and July 4 when planted in early April in southern Delaware).

As our weather becomes more variable, the use of the GDD scheduling model will be more useful as historical temperature data changes. You can create your own historical GDD charts from the information provided at the DEOS site (or other historical weather records for your area). Use a 10-year rolling average. A GDD tracking tool with 15 and 30 year averages and extremes is available online at: <http://climatesmartfarming.org/tools/csf-growing-degree-day-calculator/>



Average growing degree days in July for southern Delaware are 25 per day (from weather records). To have the corn you require every 3 days, you would multiply $3 \times 25 = 75$ growing degree days. Therefore, you would space your plantings in the spring 75 growing degree days apart. As you move into August, the growing degree days are similar but for September corn the growing degree days drop to 20 per day and plantings should be 60 GDD apart. This means that the first 20 plantings should be spaced 75 GDD's apart (April through early June) and after that you would space plantings 60 GDD apart (mid-June onward).

In summary:

- Make the first planting as you normally do for your first intended harvest date.
- Estimate the time of harvest and calculate average GDD per day in the harvest period.
- Determine the number of days you plan to harvest the planting (three in our example).
- Calculate the GDD that will accumulate during the harvest period ($3 \text{ days} \times 25 \text{ GDD/days} = 75$).
- Record maximum and minimum temperatures and calculate $GDD = ((\text{Maximum Temperature} + \text{Minimum Temperature})/2) - 50^\circ\text{F}$
- Add daily GDD from planting until they equal the GDD in the intended harvest period (75).
- When GDD equal those in the harvest period, make the next planting.
- The process can be repeated for subsequent plantings and other varieties.
- To obtain specific variety GDD information, contact your seed supplier.

*Dr. Johnson is Extension Vegetable & Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 29, Issue 1, March 5, 2021.*

STAND 'N PLANT

<h3 style="text-decoration: underline;">SEEDER</h3> <p>Use for...</p> <ul style="list-style-type: none"> • Seeds • Onions • Garlic 	<h3 style="text-decoration: underline;">PLANTER</h3> <p>Use for...</p> <ul style="list-style-type: none"> • Transplants • Potatoes • Bulbs 
--	---

Easily plant hundreds of seeds or plants per hour into plastic covered or bare ground seed beds.

Stand 'N Plant
95 Rose Road, Saltsburg, PA 15681
Phone: 724-639-3965 or visit: www.standnplant.com

VEGETABLE PRODUCTION

The Rise of the Sweet Potato

Thomas Butzler

Sweet potatoes are working their way into our meals more and more. Is it because Americans are becoming adventurous with their taste buds? Or are we becoming more aware of the health benefits of a diet heavy in vegetables?



A lug of Covington sweet potato, a clone from North Carolina State University, harvested from Dr. Luis Duque's research program. Photo: Tom Butzler, Penn State

Whatever the case, sweet potato consumption is on the rise. According to the latest United States Department of Agriculture statistics, yearly consumption was around 4.2 pounds in 2000. In 2016 (last year data was collected), Americans upped that average to 7.5 pounds.

To address that need, American farmers have been busy planting, with last year's total reaching 147,000 acres. Leading the way is North Carolina, followed by California, Mississippi, and Louisiana. Knowing the placement of states within the US, you can correctly assume that this is a heat-loving crop (source of origin is tropical America). But the crop is making inroads into our growing region. The Northeast accounts for about 1600 acres on 818 farms with Pennsylvania at 144 acres.

Dr. Luis Duque, Research Professor from Penn State's Plant Science Department, has been conducting research to determine what varieties might perform best in Pennsylvania's soils and climate. Many of the entries, representing a wide diversity of skin and flesh colors, were from North Carolina State University (NCSU) and Louisiana State University (LSU).

Several varieties rose to the top, all of which were orange-fleshed. One of those was Beauregard, a 1987 release from LSU. It is noted to store well but can be misshaped under flood conditions. The other top performing LSU entry, Orleans, is very similar to Beauregard but without as many misshapen roots. The top NCSU performer was Covington. In the Tar Heel State, it comprises 90 percent of the acreage planted.

Continued on page 20

HEALTHY PREDATORS, PARASITES ON PATROL

Use Biocontrol To Stamp Out:

- Aphids
- Whiteflies
- Fungus Gnats
- Spider Mites
- Thrips

References available in your area.

"I was REALLY pleased! I didn't see aphids [on the tomatoes] during the whole growing season."

Vernon Weaver
McAlisterville, PA

Hearty Beneficials GUARANTEED
Call 315.497.2063

IPM Laboratories, Inc.
ipminfo@ipmlabs.com
Since 1981

www.ipmlabs.com

After 12 years of grafting...

Let our mistakes along the way pay for your success! We supply custom orders of GRAFTED plants including: Tomato, Pepper, Eggplant and Watermelon.

142 Black Swamp Rd.
Bainbridge, PA 17502

717-286-7658 * grafted@redivined.net

VEGETABLE PRODUCTION

The Rise of the Sweet Potato *continued from page 19*



Sweet potato research trial at Penn State's Horticulture Research Farm. Each yellow flag represents a different variety. Photo: Tom Butzler, Penn State

The tender annual needs 100–120 days to reach maturity. Contrast that to some of our garden standards such as lettuce (45-60), cucumbers (55-65), and sweet corn (70-105). The crop is started as rooted pieces of a sweet potato vine, called slips. The slips should only be planted until soil temperatures have reached 65 degrees F, no different than the seeding requirements of our other warm-season crops. Planting could be speeded up several days by using raised beds and black plastic mulch.



Dr. Luis Duque harvesting sweet potato varieties from his research plot at Penn State's Horticulture Research Farm. Photo: Tom Butzler, Penn State

Nitrogen requirements are around 50 pounds per acre and a soil test will assist with the phosphorus and potassium recommendations. For home gardens, a general rule of thumb would be 3 tablespoons of 10-10-10 equivalent per 10 feet or row. Irrigation is very critical the first two months after planting. By that time, roots can reach depths of 2.5 feet and withstand drought-like conditions. Like watering, weed control is initially important but as the vines spread out, they easily out-compete and shade out weeds. Unlike potatoes, which are tubers (enlarged underground stem), sweet potatoes are enlarged roots. These need to be dug before a frost as decay in the vines quickly advances to the underground structures.

While Pennsylvania growers will have a tough time competing with the sweet potato growing centers in the southern US, it can be an option for direct market operations (farmers' markets, roadside stands, etc.). It can also provide offerings into the fall and winter months. For the home gardener, it's a chance to widen the variety of products coming out of the vegetable patch.

Mr. Butzler is a Penn State Extension educator in Clinton Co. From Penn State Extension, <https://extension.psu.edu/the-rise-of-the-sweet-potato>, March 9, 2021.

**Improve the planting, maintenance
and harvesting of your produce!**



Proveyor Wagon - Hydraulic conveyor harvester



ProveyorWagon.com

*Innovative equipment
for produce farmers.*

25 Old Leacock Rd
Ronks PA 17572
717-768-7619

Manufactured in
Lancaster County by:



VEGETABLE PRODUCTION

Emerging Research on Ramps: A Forest Plant With Growing Commercial Appeal

Our team is studying the importance of ramps as a forest resource to Pennsylvanians. We need your help!



Allium tricoccum, ramps, produce leaves before most other plants in the spring.

As the days warm in early spring, ramps (also known as wild leeks) will be helping to "green up" the forest understory throughout Pennsylvania. Ramps are a celebrated sign of spring and can be recognized by their broad, flat (and pungent) leaves which can carpet the forest floor in springtime before the forest canopy trees leaf-out. They can form extensive patches, and for some lucky forest landowners can occur "as far as the eye can see."

Ramps are harvested for their edible bulbs, leaves, and even flowers. They can be eaten fresh or prepared for a variety of dishes as a substitute for garden onions or garlic. They can also be preserved, pickled, fried, and dried. The opportunities for the home chef are only limited by one's own creativity.

During the spring "peak" harvest season, many communities throughout Appalachia offer dinners and festivals featuring ramps. Ramps have even been dubbed a "cultural keystone species." In recent years, interest has expanded beyond rural Pennsylvania and Appalachia to urban cities in the eastern U.S. as more people strive to eat locally and seasonally. More chefs are adding ramp dishes to their menus, with the result that suppliers can have a difficult time keeping up with demand.

Ramps are a vulnerable, slow-growing perennial plant. Each

harvestable plant typically takes five or more years from seed to reach harvestable size. Most commercially sold ramps in Pennsylvania are harvested from wild populations located on private forestlands. As ramps continue to grow in popularity, over-harvesting of wild ramp populations could result in declines of wild populations. Appropriate stewardship is needed to help ensure that a sustainable industry develops featuring science-based husbandry and management of wild populations.

With funding from the Pennsylvania Department of Conservation and Natural Resources (DCNR), our team is studying the importance of ramps as a forest resource to Pennsylvanians and developing information that can be used to guide sustainable wild crop management. We are asking for assistance from Pennsylvania forest landowners with the following:

We are interviewing and surveying individuals who harvest ramps for personal use or for commercial sale at farmers markets or to restaurants and businesses. If you **harvest ramps, personally or commercially**, please email (cvp5259@psu.edu) or call (814-867-1743) Penn State graduate student **Cathryn Pugh**.

We are studying ramp habitat in Pennsylvania to better understand environmental factors that determine ramp occurrence on forestlands, to assist with management and forest farming efforts. If you have **ramps on your property**, please email (cjs7115@psu.edu) or call (814-867-1740) Penn State graduate student **Cassie Stark**.

From Penn State Extension, <https://extension.psu.edu/emerging-research-on-ramps-a-forest-plant-with-growing-commercial-appeal>, February 26, 2021.

NOURSE
Delivering Quality

High-quality plants.
Exceptional customer service.

**It's our mission.
Literally.**



NourseFarms.com | 413-665-2658 | info@noursefarms.com

VEGETABLE PRODUCTION

Dry Bulb Mite Found in Maryland Garlic

Gerald Brust and Karen Rane

In December we received a sample of damaged garlic cloves from a grower on the Eastern Shore. The grower quite astutely thought it might be due to mites and he was correct. But it was not the garlic bulb mite (*Rhizoglyphus* spp), instead it was a mite that has not been recorded in Maryland until now, the dry bulb mite *Aceria tulipae*. It is the most important eriophyid mite attacking bulbous plants such as garlic, onion and tulip. This pest is a microscopic (only 1/100 inch), white mite with a cylindrical shape that tapers away from the head-end where its four legs are located. The mites go through two larval phases during their development. A complete life cycle at 75-80o F takes just 8-10 days. All life stages of the mite can overwinter on infected garlic while in storage and all stages also can survive in the soil on wild and cultivated *Allium* species, including onion, garlic and leeks.

Mites can be found on the foliage of *Alliums* where they are mainly located in the central veins or midribs of the leaves. Once the plant leaves die, the mites move to the bulbs in the ground. The mite is then found between the layers of the bulb when in storage and will feed using their very short pincer-like mouthparts to prick the plant tissue often making brown very small pits in cloves (Fig. 1). Dry bulb mites will feed on healthy green plant

tissues while bulb mites *Rhizoglyphus* spp, feed primarily on decaying tissue, thus making the dry bulb mites much more of a problem for garlic and onion growers. Light infestations of this mite are very difficult to detect and is the reason infested bulbs can be used as seed in a field.

Figures 2, 3 and 4 do an excellent job of showing how hard it is to actually detect even a very large population of dry bulb mites on a garlic clove. Figure 2 shows the clove under low magnification with large areas of feeding damage (browning tissue) with a whitish 'dust' to the left in the picture (you cannot see any mites yet), magnifying this further you can see in Figure 3 the white 'dust' now can be seen as tiny white thread-like shapes and Figure 4 under greater magnification shows hundreds of these cylindrical or thread-like shapes—all being dry bulb mites. Most of the mites on this bulb were dead most probably due to the drying process of the bulb.

Most, but not all management tactics involve cultural controls. The first is to rotate out of a field that is known to have the mite for at least 3-4 years making sure there are no volunteer or

Continued on page 27



Figure 1. Feeding damage on garlic clove by dry bulb mites

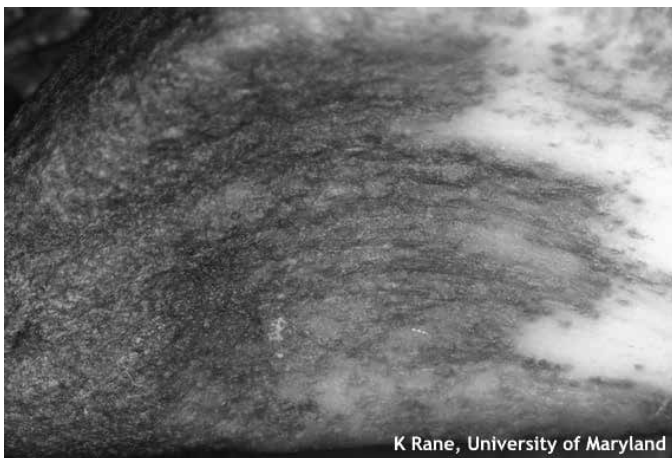


Figure 2. Garlic clove with brown areas (left side) showing dry bulb mite feeding damage with a white 'dust'

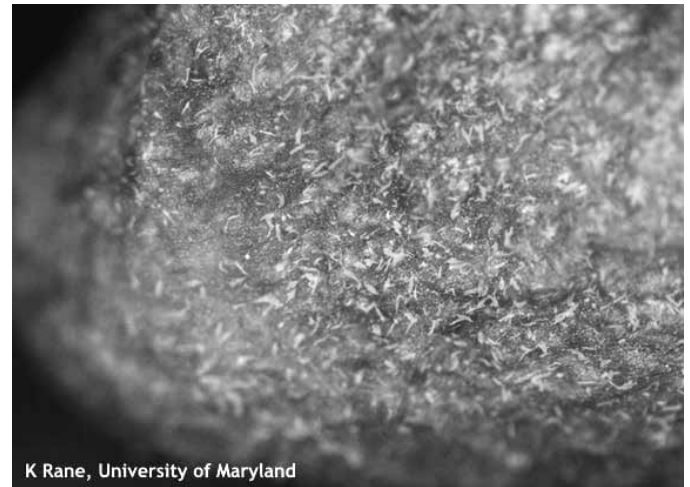


Figure 3. Area of garlic clove with heavy mite feeding under greater magnification showing tiny white thread-like objects

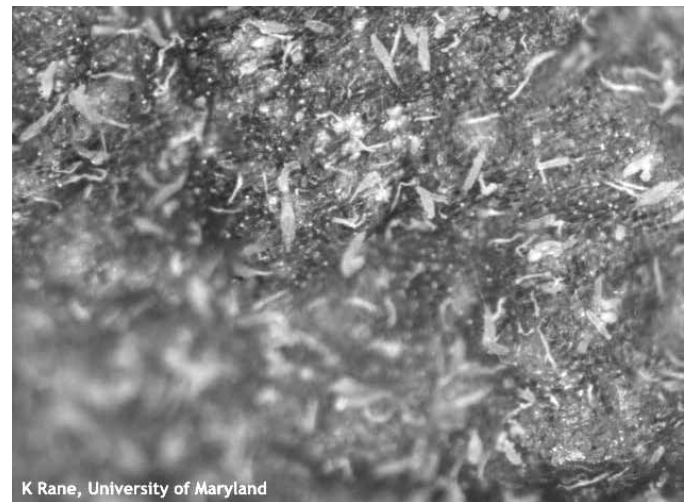


Figure 4. Greater magnification of Fig. 2 showing 100s of dry bulb mite bodies.

Copper Resistance in Bacterial Leaf Spot Found in New Jersey During 2020 Growing Season

Andrew Wyenandt

Copper resistance has been detected in bacterial leaf spot of tomato and pepper and in *Pseudomonas chitorii*, the causal agent of bacterial leaf spot in basil, in New Jersey. While not surprising, copper resistance has been known to develop for decades now; however, this is the first time it has been confirmed in vegetable crops in New Jersey. Copper applications for the control of bacterial diseases in many crops has been a mainstay for decades now and is often applied in weekly protectant fungicide programs. In 2019 and 2020, with help from Dr. Nrupali Patel and Dr. Don Kobayashi, bacteriologists in the Department of Plant Biology located on the New Brunswick campus, a survey was begun to determine which species of bacterial leaf spot are most prevalent in New Jersey vegetable crops. Bacterial leaf spot can be caused by four species of *Xanthomonas*: *X. euvesicatoria*, *X. vesicatoria*, *X. perforans*, and *X. gardneri*. Currently, there are four races of BLS found in tomato (T1-T4; one for each of the 4 species stated above) and eleven races found in pepper (0-10). Differential tests in southern New Jersey using various bell pepper lines over the past 15 years has suggested that the number of races of BLS in pepper has increased over time; with all races present in the State to date. Lab testing results from samples collected from the small number of NJ vegetable farms the last two summers has shown the presence of *X. euvesicatoria* in pepper, as well as *X. euvesicatoria* and *X. perforans* in both tomato and pepper in the state, with ~50% of all samples testing positive for copper resistance.

How do you know what species of bacteria are present on your farm?

The only way to determine which species of bacteria are present in tomato or pepper crops on your farm are to have them identified through laboratory methods.

How do you know what races of the pathogen are present on your farm?

That's a difficult question to answer. Up to now, the only way to know is through differential testing. That means planting a number of different bell peppers with varying BLS resistance packages and monitoring which cultivars develop symptoms. For example, if you detect BLS development in Aristotle X3R (which has resistance to races 1,2, & 3); then you possibly have races 4-10 present on your farm. If you were to plant Turnpike in that same field and you have BLS development in it, then you possibly

have race 6 or 10 present, because Turnpike has resistance to BLS races 0-5 and 7,8,9. It's extremely important to know what races of BLS are present so you can choose the proper cultivars to grow. Choosing the proper cultivar will do two things: significantly reduce the chances of BLS development and significantly reduce the number of copper applications on your bell pepper crop. As a note, there are a few non-bell peppers available with BLS resistance packages (see 2020/2021 Commercial Vegetable Production Recommendations Guide).

How do you know if copper resistance is present on your farm?

Growers who have used copper applications for controlling bacterial leaf spot in crops such tomato or pepper for many years should always monitor for efficacy. If you notice or have noticed a loss in copper efficacy over time, then there is a good chance copper resistance is present. Once copper resistance is detected, further applications will be unwarranted and ineffective. The only method to truly determine if copper resistance is present is through laboratory testing, however growers who pay close attention to efficacy should have a good idea if copper is still effective.

What can you do to mitigate bacterial leaf spot development on your farm?

In crops such as bell pepper, it comes down to growing cultivars with resistance to BLS and knowing what races are present on your farm. Many of the recommend commercial cultivars have varying resistance packages to the different races of the pathogen. Some cultivars, such as Paladin which has Phytophthora resistance has no resistance to BLS. Other "older" cultivars such as Aristotle X3R has resistance to races 1-3; newer cultivars such as Turnpike has resistance to races 0-5,7-9; while cultivars such as Playmaker and 9325 have resistance to 0-10 (also known as X10R cultivars). Unfortunately, BLS resistance in commercial tomato varieties are lacking, but efforts from around the world are making progress.

*Dr. Wyenandt is an Extension Specialist in Vegetable Pathology at Rutgers Univ. From the **Plant and Pest Advisory**, Rutgers Cooperative Extension, <https://plant-pest-advisory.rutgers.edu/copper-resistance-in-bacterial-leaf-spot-found-in-new-jersey-2>, March 11, 2021.*

Hillside Cultivator Co. LLC



Hydraulic adjusted cultivator for the edges of plastic mulch



Cultivators especially for **Strawberries**



Eco Weeder for close cultivation around individual plants

For more information visit hillsidecultivator.com

Contact: John Shenk 717-669-3158 Lititz, PA hillsidecultivator@gmail.com

BERRY PRODUCTION

Watch for Scale Insects on Blueberries While You Are Pruning

Kathleen Demchak

This is the time of year to watch for scale insects on blueberries and prune out infested canes and branches. Soon it will be time to treat the plants if you find these pests.



Old blueberry canes have a more roughened appearance, providing hiding places for scale insects. Photo: Kathy Demchak, Penn State

While there are over 20 different species of scale insects known to affect blueberries in the northeastern U.S., Putnam scale has been the one most commonly found in commercial plantings. The first symptom noticed is often a decrease in the vigor of the plants, though, in the case of Putnam scale, tiny dots on the fruit, canes, or leaves also may be noticed.

Scale insects in general are worse in plantings that have many old canes and least problematic in plantings that are regularly and thoroughly pruned. The scale insects prefer living where they are protected. Since older canes have rough shaggy bark and good hiding places, the problem may not be detected and populations may build over time. While the scale insects may be found on other plant parts, including the fruit, this is thought to occur when populations are already plentiful under the bark. Since spotted wing drosophila has increased the need for certain insecticide sprays during the harvest season, populations of the many natural enemies of scale insects may be negatively impacted, possibly making issues with scale insects more common.

In the case of Putnam scale (see pictures in online article at <https://extension.psu.edu/watch-for-scale-insects-on-blueberries-while-you-are-pruning>), in particular, identification and understanding the life cycle is tricky. The color of Putnam scale varies with the location where it “settles” on the plants, making identification challenging. The settled scale looks like a small raised waxy dot on canes, leaves, or fruit, and often fruit is dimpled where the scale is feeding. If the scale covering is lifted, the insect itself may be seen, but that would require the assistance of a hand lens or magnification for good visibility. Further, whether one or two generations per year occur throughout Pennsylvania is unclear. One generation per year was documented in the 1970s in Pennsylvania, while a detailed study conducted in southern New Jersey in the late 1990s by Sridhar Polavarapu confirmed two generations per year there. Putnam scale insects overwinter as second-instar nymphs, which then progress through three more instars in late winter and early spring. The last of these (the adults) lays eggs in late spring, from which crawlers hatch. The crawlers find new locations to feed and settle on the plant, either under the bark or elsewhere if populations are high, possibly including fruit. If there is a second-generation, the cycle repeats and a second “wave” of crawlers emerges in mid-summer which then look for

locations where they can overwinter.

One key in controlling scale insects, in general, is to prune thoroughly and keep the canes young. By providing fewer hiding places for all life-cycle stages, natural enemies are more likely to find pests and keep populations in check. Dormant oil (with or without pyriproxyfen - trade name Esteem) applied before bud-break in spring is effective if high water pressure and volume are used. Make the application when temperatures are well above 40 degrees, as damage can occur if temperatures drop below freezing after application. Alternatively, lime sulfur alone, also in high volumes of water to get good coverage under the bark, is effective. Dormant oil and lime sulfur should not be applied within 14 days of each other as phytotoxicity is likely to occur.

While these are the main methods of control, an additional but more nuanced approach is to add an Esteem spray application targeting crawlers in late spring (and in mid-summer if a second generation is present—watch the 7-day PHI on blueberries). It will be difficult to know the correct timing without monitoring. Monitoring requires using double-sided white or black sticky tape to improve visibility and detect crawlers when they are on the move. They are unprotected by a waxy coating and susceptible to insecticides at this time. As always, make sure that the products you are using are legal for use in the state where your farm is located, and follow all instructions that appear on the label.

Ms. Demchak is with the Department of Plant Science at Penn State Univ. From Penn State Extension, <https://extension.psu.edu/watch-for-scale-insects-on-blueberries-while-you-are-pruning>, March 8, 2021.

HOW TO USE PEPPERS

Check your way through the bounty that Pennsylvania has to offer. Share your story with others - tag #paveggies.

STUFF

Hollow them out and fill with your choice of meat, vegetables, cheese, rice, sauce, and/or more!

ROAST

They keep for several weeks in the fridge, so make a big batch and enjoy on salads, in sauces, you name it!

DIP

Slice the peppers into 1/2 inch strips and use them to scoop up your favorite sauce or dip, like hummus!

JUICE

Sweet peppers, like the common bell, are deliciously fragrant and nutritious when juiced.

FREEZE FOR LATER

Perfect for punching up the flavor in your cold weather dishes, like chili, soup, and pasta.

MORE TIPS, TRICKS & RECIPES: PAVEGGIES.ORG



An example of free vegetable promotion graphics from the Pennsylvania Vegetable Marketing and Research Program for your use in ads, signs and social media - available free at <https://www.paveggies.org/farmers-farmers-toolkit/graphics/>.

GREENHOUSE PRODUCTION

Greenhouse Pest Prevention with *Beauveria bassiana*

Thomas Ford

Plugs and vegetatively propagated materials are starting to arrive and despite your best efforts to keep pests at bay, you may inadvertently introduce new ones into your greenhouse environment.



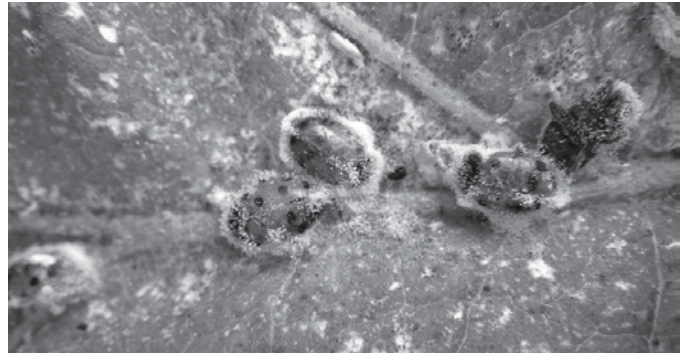
Plugs arriving in a Pennsylvania greenhouse. Photo by Tom Ford, Penn State

Many of my greenhouse educator colleagues have long preached about inspecting plug shipments for pests, isolating them in a greenhouse as a precaution, and even rejecting a shipment if pest problems were visible. While this is sage advice almost every grower that I have ever worked with has never rejected a shipment of plugs or vegetative cuttings because they feared that they could not obtain replacements which would leave them with a major hole in their spring inventory.

While I recognize that schedules and production plans are critical to spring success, the introduction of INSV (Impatiens Necrotic Spot Virus) carrying thrips into your production area could leave an unwanted legacy in your operation that may be ultimately more costly than being short 20 flats of the latest and greatest petunia.

In baseball, if you go 2 for 3 you generally had a very good day. In the greenhouse industry if you inspect and isolate, but fail to control/ contain hitchhiking pests on plug and/or vegetative materials you are striking out with the bases loaded in the bottom of the ninth inning every time. One way that a grower can tilt the odds in their favor when plugs/cuttings arrive is to consider dipping plug trays or vegetatively propagated materials into a "bath" containing an appropriately labeled biologically-based insecticidal product.

The "white muscardine" fungus which is known as *Beauveria bassiana* is one of several entomopathogenic fungal organisms that are labeled for use in managing a wide array of insects in greenhouses and in nurseries. *Beauveria bassiana* as an entomopathogenic fungus have the capacity to penetrate the cuticle and kill almost every insect that it comes in contact with. While this is generally a good thing, *Beauveria bassiana* may also kill some biocontrol agents like ladybird beetles if they become exposed to it.



Ladybird beetles inadvertently killed by the "white muscardine fungus" (*Beauveria bassiana*) in a PA greenhouse. Photo by Tom Ford, Penn State

Beauveria bassiana is considered by many entomologists as one of the more effective biocontrol agents to deploy as a plug or cutting dip. Insects and some mites when exposed to this entomopathogenic fungus typically die within 4-5 days after exposure.

Mycotrol WPO and BotaniGard 22WP are two *Beauveria bassiana* containing mycoinsecticides that are labeled for cutting/plug dips. BotaniGard 22WP or Mycotrol WPO are mixed at a rate of 1/4 to 1/2 oz per gallon of water or 2.5 to 5 oz per 10 gallons of water. As a best management practice, it is recommended that growers should only mix-up enough dip solutions to use in one day. Dip solutions are considered perishable and their efficacy will diminish significantly if their use is extended beyond that first day.

While most plants are not injured by dip solutions containing BotaniGard 22WP or Mycotrol WPO it is recommended that growers conduct a limited trial first before treating an entire lot of cuttings or plugs. When treating plugs or cuttings it is important to wet all plant surfaces to ensure good coverage and pest contact.

Mycoinsecticides like BotaniGard 22WP and Mycotrol WPO while legally labeled, list a variety of precautions that applicators must follow when deploying them in dip solutions. Adherence to the pesticide label is critical when applying any pesticide in a greenhouse environment. So please follow the label every time.

Insecticidal soaps are frequently recommended by some horticultural professionals as a means to increase the efficacy of the pre-plant cutting or plug dips. Unfortunately, if you read the labels of some of the most commonly used insecticidal soaps on the market like Kopa and M-Pede you will discover that this practice is not on their official EPA labels. In the case of the Gowan product, M-Pede you will find that they recommend that this product not be applied to cuttings or transplants because of injury concerns. Both Kopa and M-Pede have 12-hour REIs and will require that personal protective equipment be worn when entering treated areas prior to the expiration of the REI. While you may see insecticidal soaps recommended for incorporation into plant dips, this use cannot be legally recommended at this time.

Mr. Ford is a Penn State Extension Educator in Cambria Co. From Penn State Extension, <https://extension.psu.edu/greenhouse-pest-prevention-with-beauveria-bassiana>, March 10, 2021.

GREENHOUSE PRODUCTION

Damping-off: Identifying and Controlling Pathogens in Transplant Production

Andrew Wyenandt

It is extremely important to know which pathogen is causing damping-off problems and which fungicide to properly apply. The key to controlling damping-off is being proactive instead of reactive. Always refer to the fungicide label for crop use, pathogens controlled, and application rates.

Damping-off is caused by a number of important vegetable pathogens and is very common during transplant production. Damping-off can kill seedlings before they break the soil line (pre-emergent damping-off) or kill seedlings soon after they emerge (post-emergent damping-off). Common pathogens that cause damping-off include *Pythium*, *Phytophthora*, *Rhizoctonia* and *Fusarium* spp.

Control of damping-off depends on a number of factors. First, is recognizing the conditions which may be leading to the problem (i.e., watering schedule/greenhouse growing conditions) and second, identifying the pathogen causing the problem. Reducing the chances for damping-off always begins with good sanitation practices prior to transplant production.

Conditions Favoring Damping-off

Although all four pathogens are associated with damping-off, the conditions which favor their development are very different. In general, *Phytophthora* and *Pythium* are more likely to cause damping-off in cool, wet or overwatered soils that aren't allowed to dry out due to cloudy weather or cooler temperatures. Conversely, *Rhizoctonia* and *Fusarium* are more likely to cause damping-off under warmer, drier conditions especially if plug trays are kept on the dry side to help reduce transplant growth.

The two root rots causing the most problems in New Jersey during transplant production are *Pythium* and *Rhizoctonia*. In general, *Pythium* tends to kill seedlings before or right after emergence where as *Rhizoctonia* tends to kill seedlings after emergence. If you are recycling old transplant flats with organic matter left on them from the previous season you may bring pathogens such as *Rhizoctonia* back into the operation. There are exceptions to the rules, but none the less, all damping-off pathogens can cause serious losses if not controlled properly.

Pathogen Identification

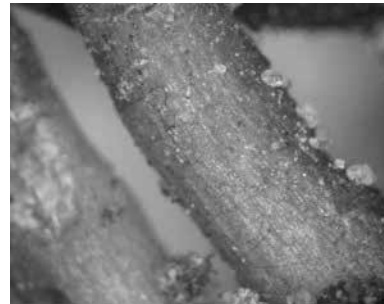
In root systems infected by *Pythium*, the outer cortex of the roots will slough-off if you pull the transplant out of the plug or if you simply pull on the roots with your fingers. If your soil has been excessively wet for periods of time because cool, cloudy weather hasn't allowed plug trays to dry out for extended periods



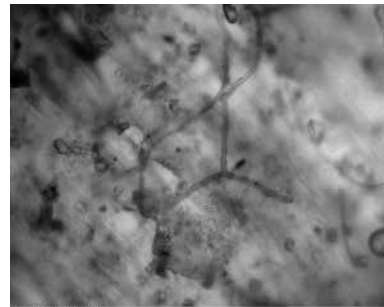
Pythium Root Rot. Photo: D.Groth, LSU

(i.e. days) you may be dealing with a *Pythium* problem. *Pythium* also tends to show up in low spots on irregular benches or the floor where plants have been sitting in water for extended periods causing 'wet feet' (i.e., water-logged root systems).

In root systems infected by *Rhizoctonia*, the outer cortex of the root system won't slough off. In many cases under ideal conditions, the mycelium of the fungus growing on the surface of infected roots can be seen with a 10x hand lens. *Rhizoctonia* produces distinct, brown hyphae that always branches at nearly 90 degree angles. This is a diagnostic feature of the fungus. *Rhizoctonia* often shows up on transplants where the plug remains on the dry side for extended periods when growers reduce water to control plant growth. In the field this can occur shortly after transplanting when the drip irrigation system is not hooked up.



Rhizoctonia: Note the brown "shoestrings" on the outside of the infected strawberry root



Rhizoctonia Root Rot on Strawberry Transplants

Treatment Options

Why is recognizing the different symptoms and diseases so important? The fungicides applied to prevent or control damping-off are specific in the pathogens they control. Fungicides used to control *Pythium* or *Phytophthora* won't control the other damping-off pathogens. Why is this? The biology of the fungus and the mode of action of the fungicide dictates fungicide efficacy.

For example, Ridomil Gold and Ultra Flourish (mefenoxam, FRAC code 4), MetaStar (metalaxyl, 4), Previcur Flex (propamocarb, 28), Ranman (cyazofamid, 21), Presidio (fluopicolide, 43), and Phosphites (33) help control the "water molds" (i.e., *Pythium* and *Phytophthora*). Azoxystrobin (FRAC code 11) help control damping-off caused by *Rhizoctonia* root rot. Ranman, Previcur Flex, and phosphites have greenhouse use labels for *Pythium* control (see labels for specific crops and uses in Table E-11 in the upcoming 2020/2021 Mid-Atlantic Commercial Vegetable Production Recommendations Guide).

There are many organic options that can be used to suppress these pathogens in transplant media. These biologicals include *Bacillus subtilis* (Companion), *Streptomyces lydicus* (Actinovate), *Streptomyces griseoviridis* (Mycostop), *Trichoderma harzianum* (PlantShield, Rootshield), and *Trichoderma virens* (SoilGard).

GREENHOUSE PRODUCTION

VEGETABLE PRODUCTION

These products can either be drenched on or incorporated into the media prior to seeding and/or transplanting. These products work by colonizing root surfaces and competing with the pathogen for space and resources. The mechanisms of control by biologicals include some form of antibiosis, parasitism, induction of host defense responses, or competition.

Disinfectant products such as Zeritol and Oxidate (hydrogen dioxide) may also be used to help suppress pathogens in organic or conventional transplant production. It's important to understand that disinfectant products also kill biological agents, therefore caution should be used when using these in rotation with organic products. The same holds true for all conventional products. For a list of options for use in greenhouses on specific crops please see Table E-11 in the upcoming 2020/2021 Mid-Atlantic Commercial Vegetable Production Recommendations Guide. See individual crop section for options in the field. Always refer to the fungicide label for crop use, pathogens controlled, and application rates.

Dr. Wyenandt is an Extension Specialist in Vegetable Pathology at Rutgers Univ. From Plant and Pest Advisory, Rutgers Cooperative Extension, <https://plant-pest-advisory.rutgers.edu/damping-off-identifying-and-controlling-early-season-pathogens-2-2-2/>, March 11, 2021.

Dry Bulb Mite Found in Maryland Garlic continued from page 22

wild Allium species left in the field during the rotation. Be sure to plant clean seed, as infested cloves are the most frequent source of infection in the field. Flood irrigation or even heavy winter rains can reduce these mite populations. Soaking seed stock for 24 hours immediately before planting in a 2% soap (do not use a detergent) and 2% mineral oil water bath will greatly reduce mite populations in the field. Light or moderate infestations are usually controlled via the normal drying process prior to storage. Dusting bulbs with sulfur prior to planting has reduced populations in the field. Be sure to control any wild Allium species in the field before and after planting. In storage the mites' feeding can cause the cloves to desiccate and shrivel. Dry bulb mite feeding may also open the bulb up to soft rot bacteria resulting in rotting bulbs. Although hot water treatment of the seed garlic at 130° F for 10–20 minutes can give you good control of the mites it will more than likely damage the bulbs and reduce germination. So be careful with this last recommendation and use only as a last option.

*Dr. Brust is the IPM Vegetable Specialist at the Univ. of Maryland and Ms. Rane is the Plant Diagnostician at the Univ. of Maryland. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 29, Issue 1, March 5, 2021.*



PREMIUM PROFESSIONAL PEAT-BASED SUBSTRATES



LM-GPS
Professional Germination
Germination, Plugs
and Seedlings
Suavemente para
Germinación, brotes
y semillas
3.8 55
107 25



LM-AP
All Purpose
Germination, Plugs
and Seedlings
Suavemente para
Germinación, brotes
y semillas
3.8 55
107 25

FOR ALL YOUR GERMINATION AND ALL PURPOSE NEEDS



products available
OMRI
LISTED
Para Producción Orgánica
For Organic Use

JEFFREY P. BISHOP
Cell: (315) 480-1900
Toll Free: (888) 632-8808
lambertpeatmoss@aol.com
www.lambertpeatmoss.com

Your Source for . . .

HIGH TUNNELS



Call Harry Edwards @ 717.606.8021
or Email hedwards@rimol.com

Pennsylvania Vegetable Growers Association

815 Middle Road
Richfield, Pennsylvania 17086-9205
717-694-3596
pvga@pvga.org
www.pvga.org

Address Service Requested



PRESORTED STANDARD
U.S. POSTAGE
PAID
HARRISBURG PA
PERMIT NO. 533

Two Locations to Serve You Better!



Nolt's Greenhouse Supplies

Specializing in Greenhouse and Nursery Growing Supplies

(717) 354-8376

151 E. Farmersville Road
Ephrata, PA 17522



Nolt's Produce Supplies, LLC

Specializing in Vegetable Growing Supplies and Equipment

(717) 656-9764

152 N. Hershey Avenue
Leola, PA 17540



Compact Raised Bed Mulch Layer



Greenhouses & High Tunnels



Hyd Reset Mulch Lifter



Hyd Drive Wrapper



Water Wheel Transplanter

Please contact us for our free commercial growers catalogs or view it on our website: www.noltsproducesupplies.net