

## Mid-Atlantic Fruit and Vegetable Convention to Go Virtual for 2021

This year will be one we will all remember for many years to come as our world has been turned upside down in many ways. While the 2021 Mid-Atlantic Fruit and Vegetable Convention will be unlike any of the past 44 annual gatherings of growers in Hershey, the Convention Joint Committee and program chairs are working hard to make sure this year's virtual event will meet the main goals of the Convention – providing mid-Atlantic growers with a robust educational program on the latest in growing and marketing practices and enabling them to be in contact with the suppliers of the latest innovations in equipment and supplies.

The virtual format even offers some advantages in that growers will be able to attend the educational sessions and visit the exhibitor “booths” not only during the four days of the Convention but 24 hours-a-day, 7 days-a-week during the rest of February and all of March. There will even be the opportunity to interact by a “chat” function with others attending the virtual Convention – but admittedly that will not come close to replicating the in-person interaction with exhibitors and fellow growers we all hope and pray will be available at the 2022 Mid-Atlantic Convention.

Below are answers to some frequently asked questions about a virtual convention:

### What does virtual mean?

During COVID-19, it seems everything has gone virtual – school, church, shopping, - and the Mid-Atlantic Convention. That means there will be no live educational sessions or industry trade show at the Hershey Lodge this winter, but if you have access to a computer, smart phone or electronic tablet, and the internet, you will be able to hear and see expert speakers from across the nation tell how you can improve your production,

marketing and profitability. Plus you will be able to see on the screen what new products and money-saving deals in equipment and supplies industry exhibitors are offering this year in the trade show part of virtual event. Some exhibitors will even be available to “chat” with you online during certain time periods – especially 11:00 a.m. to noon each day.

### What about room reservations?

Well, the good news is you don't need any – you can sleep in your own bed for free! (If you already made a reservation, cancel it – or change it to February 1 to 3, 2022 if you can!). Not only will be you saving the cost of your hotel room, you won't be using any gas driving to Hershey and you can enjoy home-cooked meals. While the virtual format attempts to replicate many aspects of an in-person event, they haven't developed a virtual banquet platform that is very satisfying so we have not included a banquet in this year's Convention.

### How much is the registration fee and how do I register?

This year we are offering a flat registration fee of \$40 per person that will enable you to access all the educational sessions, the exhibitor booths, the research posters and the rest of the virtual Convention website not only during the four days of the Convention from February 8 to 11, but 24/7 until the end of March. Since the Convention itself is online, all registrations will also be online with the payment being by credit card or by check.

*Continued on page 20*

## NEWS



**Pennsylvania  
Vegetable Growers  
Association**

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

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Berwick

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**William Troxell**  
Richfield

## What's Happening on the Farm

*Brian Campbell*

What a great time of year! The harvest on the farm is almost completed. A time to be thankful. One may say, "Thankful, we had a terrible year, it was very dry, our crops didn't do well, I don't know how I am going to pay the bills". Guess what, this isn't the time of year to be a pessimist, its time to be thankful for the things that you were able to achieve. No matter how bad you may feel you had it, someone else had it worse. Keep your head up, smile, do something for others, be Thankful for what you do have. A time of gathering for family and friends. A time to look back at the year and look at many of the things that brought smiles to faces. Look at the beauty that abounds outdoors, look out over the fields and appreciate what the life of a farmer can provide for a family and friends. We farmers help feed the world, that alone we can be thankful for.

I am Thankful and Proud to be a Farmer.

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

## PVGA Annual Meeting

The Annual Meeting of the General Membership of the Association will be held virtually this year at a time and date that will be announced in the December newsletter.

### WINTER CONVENTION CALENDAR

**January 5-7, 2021.**

South East Regional Fruit and Vegetable Conference – Virtual.  
Visit [www.seregionalconference.com](http://www.seregionalconference.com).

**January 19 - February 5, 2021.**

PASA's Farming for the Future Conference – Virtual.  
Visit [www.pasafarming.org](http://www.pasafarming.org) or call 814-349-9856.

**January 6-8, 2021.**

Illinois Specialty Crops, Agritourism, and Organic Conference – Virtual.  
Visit [www.specialtygrowers.org](http://www.specialtygrowers.org) or call 309-557-2107.

**January 12-14, 2021.**

Empire State Producers Expo – Virtual.  
Visit [www.nysvga.org](http://www.nysvga.org) or call 585-993-0775.

**January 18-20, 2021.**

Ohio Produce Network – Virtual.  
Visit [www.opgma.org](http://www.opgma.org) or call 614-221-1900.

**February 22-25, 2021.**

New Jersey Agricultural Convention and Trade Show – Virtual.  
Visit [www.njveggies.org](http://www.njveggies.org) or call 856-358-2064.

The **Pennsylvania Vegetable Growers News** is the official monthly publication of the Pennsylvania Vegetable Growers Association, Inc.,  
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Phone and fax: 717-694-3596 • Email: [pvga@pvga.org](mailto:pvga@pvga.org) • Website: [www.pvga.org](http://www.pvga.org)

**Our Mission:**

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

**Our Vision:**

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

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

## NEWS



## PVGA Membership - A Bargain Too Good to Pass Up!

Nearly 3,000 people who are not members of PVGA will be receiving this Special Convention Issue of the **Pennsylvania Vegetable Growers News** compliments of PVGA. We want you to join our Association. We're putting our best foot forward by inviting you to the 2021 Mid-Atlantic Fruit and Vegetable Convention and by giving you the opportunity to see a copy of our monthly newsletter. Together they represent the key educational opportunities the Association offers to its members. And member education is one of the primary missions of the Association.

We believe one of the best ways to see the vegetable, potato and berries industries of Pennsylvania prosper is to have growers who are knowledgeable and up-to-date in their production and marketing practices. Therefore, we have worked hard to offer one of the most comprehensive educational programs for growers on the East Coast at the Mid-Atlantic Fruit and Vegetable Convention. In addition, each month the **Pennsylvania Vegetable Growers News** provides PVGA members with valuable information on current issues affecting growers as well practical production information from experts at Penn State and other universities. Each week, members with email receive the **PVGA Update** with links to news and event announcements online. PVGA also usually sponsors local grower twilight meetings and farm market tours to allow growers to visit fellow growers' farms and markets in person during the growing season – although these were not able to be conducted this year due to the pandemic.

A \$50 annual membership in PVGA brings you the monthly newsletter as well as subscriptions to the American Vegetable Grower magazine and the Vegetable Growers News. That's a hard bargain to beat but, wait, there's more!!!

Last year, through the efforts of PVGA volunteers at the Association's booth at the Farm Show and from profits from the Convention, the Association was able to contribute over \$61 per member to vegetable research. Usually the Association also helps fund small fruit research but this year's pandemic interfered with several small fruit projects that were approved for funding – hopefully they can be carried out next year. We are proud to be able to help our industry stay on the cutting-edge of technology. Over the past 32 years, PVGA has given over \$1.25 million to research.

PVGA is the organized voice of the vegetable, potato and berry industries in the Commonwealth and works to represent your interests in Harrisburg and Washington. Consequently, when legislation that affects the industry is considered, the industry has an organized voice ready to protect your interests.

PVGA owns the trademark for the "Pennsylvania Simply Sweet" onion to provide Pennsylvania growers with the opportunity to market a branded crop at a premium price.

You, if you are involved in the vegetable, potato or berry industries in Pennsylvania (or nearby states), can be a part of the PVGA team by joining today. Until February 11, dues are only \$50 – a real bargain. Use the form on page 34 to join PVGA for 2021.

**If you are currently a PVGA member, it is especially important to renew your membership for 2021.**

## Marketing and Research Board Meets

The Pennsylvania Vegetable Marketing and Research Program Board met on November 9 and 16 virtually elect officers for 2021, to meet with researchers to review research pre-proposals, and to discuss promotion plans for 2021.

The Board, made up of 12 growers appointed by the PA Secretary of Agriculture, a sales agent representative and a representative of the Secretary, re-elected its current officers which are Christopher Powell of Strasburg as the Chair, Scott Hoffman of Northumberland as the Vice Chair and Kenneth Metrick of Butler as the Secretary-Treasurer.

The Board, along with some representatives from PVGA on the joint Vegetable Research Committee, reviewed 13 research pre-proposals with the researchers. They then determined which pre-proposals they were most interested in seeing full-proposals for at their February 1 meeting.

They also reviewed the promotion activities of the past year, again with some representatives of PVGA on the joint Vegetable Marketing Committee. Angela Corrado, from Kitchen Table Consultants, then reviewed the plans for 2021 under the Specialty Crop Block Grant (SCBG) project which the Program was awarded that supports the PA Produce Month promotion and other activities in 2021. Some concepts for a new SCBG proposal for 2021 were also discussed.

The Board agreed to send a final reminder to growers who had not paid the assessment for 2019 before they give that list to the Department of Agriculture's legal office for possible enforcement action. They also extended the contract for administrative services with Troxell Administrative Services for 2021. Finally, they adopted a 2021 budget that anticipates \$149,000 in income and the same amount in expenses. It includes \$60,000 in research contributions from PVGA (which may be reduced this year due to cancelation of the Farm Show and the in-person Mid-Atlantic Convention) and allocates an additional \$20,000 from growers' assessments for research. It also provides \$34,000 for vegetable promotion including \$21,300 for the SCBG project.

## Greenhouse Grower Webinar Set for January 21 and 28

Penn State Extension will be presenting a webinar January 21 and 28, at noon to help greenhouse growers stay up to date on the latest practices and techniques to produce high quality herbaceous plants. It will replace the annual face-to-face conference held each January and the Greenhouse Ornamentals sessions at the Mid-Atlantic Fruit and Vegetable Convention.

This cutting-edge program will cover new strategies for greenhouse production, insect and disease management, and production techniques. The Penn State Flower Trials Results will also be presented at this meeting to provide the most recent performance data.

Pesticide applicator credits are available to licensed applicators in Pennsylvania and Maryland.

Topics to be covered are:

- Spider mites and how to manage
- Plant growth regulator use
- Pesticide storage and transportation

Registration is \$15. To register, visit <https://extension.psu.edu/greenhouse-growers-day-webinar>.

## NEWS

## Program Continues to Actively Promote PA Veggies



The Pennsylvania Vegetable Marketing and Research Program (PVMRP) conducted its 15th annual celebration of August as Pennsylvania Produce Month this season. The campaign is designed to focus extra attention on Pennsylvania vegetables at the height of the season, equipping farmers with promotional tools and resources, while educating the consumer about PA produce and encouraging them to support their local farmers.

PVMRP is a statewide marketing order organized under the Agricultural Commodities Marketing Act. The Program includes all vegetable growers who grow one or more acres of vegetables for sale or 1,000 sq. ft. of greenhouse or high tunnel vegetables for sale or who grow and sell \$2,000 or more worth of vegetables. Growers are required to pay an annual assessment to the Program that is used to promote Pennsylvania grown vegetables and to fund practical vegetable research.

### 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!

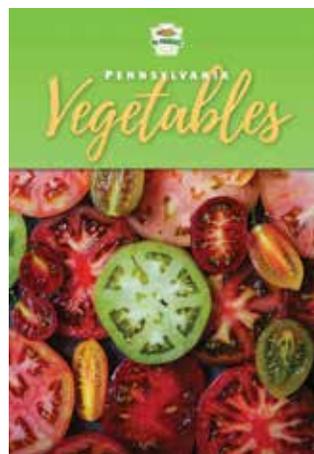
MORE TIPS, TRICKS & RECIPES: PAVEGGIES.ORG



This year, the Program again collaborated with Kitchen Table Consultants to help direct their promotions and build upon past successes. The 2020 campaign had to be altered slightly due to COVID-19 but the continued momentum from 2019, paired with the public relations efforts of 2020, proved to be critical in amassing buzz amongst the digital/virtual foodie communities. While the objectives and impacts are summarized below, it deserves mentioning that the Digital Cookbook and “How To” videos and graphics were some of the most well-received content that’s been produced for the campaign and the Program. This can in part be attributed to the marketing initiatives that have been thoughtfully refined over time, as well as the loyal and engaged audiences that have been built through careful and consistent management. Both of these - the loyal audience and brand awareness - will serve as valuable assets that can benefit the Program’s initiatives for years to come.

### Marketing Plan

A 5 Year Marketing Plan, consisting of 3 detailed years and 2 high level, is currently being finalized and will serve as a critical tool for clarifying what marketing initiatives best aid in accomplishing the Program’s goals. More importantly it will outline a roadmap for personnel to consistently and thoughtfully manage those marketing initiatives with long term profitability in mind.



### Produce Month Press Event Becomes a Digital Cookbook

As a pivot from in-person event appearances, the idea for the Digital Cookbook was to create a collaborative and informative product that offers value in a few ways: 1) to end consumers via recipes and educational content; 2) to contributors as a platform for them to showcase their talents; and 3) to farmers by promoting PA produce.

The cookbook and its individual content pieces, similar to a lot of the assets created this year, can be repurposed for many years to come. For example, recipes can be repurposed as individual blog posts to ensure the website is updated regularly. The How To videos created for the cookbook have already been added to the Farmer Toolkit and the PA Veggies Facebook so they can serve as promotional tools individually and for Pennsylvania vegetables as a whole. Recognition of PA Veggies as an authoritative brand sky-rocketed after the release of the Cookbook, especially in the social media community. PA Veggies’ Instagram has been experiencing steady Follower growth, consistent tagging of the @paveggies account, and more use of the #paveggies hashtag than ever before. The Cookbook also garnered the most press recognition and even ignited the ability for a few short videos to be produced for Around the Alleghenies’ Your Health Matters Series, of ABC23.

### Brand Video

Since part of the Program’s success rides on relationships cultivated with fellow businesses and brands in the industry, it is important that there is a brand asset for evergreen education of the Program’s purpose and mission. The Brand Video created this year, available at paveggies.org, and the Program’s Facebook and YouTube, can serve as an evergreen tool, particularly valuable in pitching to advertisers, partners, and sponsors, as well as consumers, who need to know what they’re investing in. The brand video was also placed as the Facebook Cover video for ongoing exposure and immediate branding toward Facebook Page visitors. There were two versions created, with one consisting of a direct call to action. This version was crafted with consumer marketing in mind and could be developed into a “spend \$10” campaign or slogan with the right support.

*Continued on page 6*



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## Lunar Blush<sub>F1</sub>

- Large, flat, lobed fruit great for the base of a pumpkin stack.
- Shades of champagne, pale pink, and seafoam green.
- Exceptionally heavy fruit with very thick, very dense flesh. The heaviest (for its size) we have seen in any fruit of any type.
- Fruit average 48 lbs., with some to 60 lbs.
- Strong Powdery mildew resistance.
- Excellent yield potential.
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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.

## NEWS

## Program Continues to Actively Promote PA Veggies

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### Farmer Webinar

The Farmer Webinar has been a long-awaited idea conceptualized for the sole purpose of fulfilling an important part of the Program's mission to provide Pennsylvania growers with marketing and research tools. This particular tool was intended to equip growers with a marketing skill that they could retain throughout the lifetime of their business to aid in boosting sales. The webinar was recorded and added to paveggies.org, along with written instructions, a copy of the slide deck used during the presentation, plus tools and sample assets that correspond to the webinar.

### Other Resources

Additional resources were created, such as POP materials, marketing instructions, graphics, and more, and marketing activities were performed, such as the distribution and proper placement of all the resources, in order to maintain marketing integrity for the Program through 2020.

As we bore witness to this year, the holistic approach of meeting the needs of consumers and the growers, as well as recognizing how healthy brand awareness and audience loyalty is a benefit that can be passed on to the farmers, and will be especially important for the proper execution of the marketing strategy over the next 3 to 5 years, as the plan outlines.



### New Point of Purchase Materials Introduced

Continuing the effort begun last year to update the Program's point-of-purchase materials with the "PA Produce" brand and style, the Program printed new versions of our "How to Use" information cards and added six new crops – broccoli, Brussels sprouts, cabbage, cauliflower, kohlrabi and sweet potatoes. The "Fun and Healthy Facts" student activity cards were also updated to the new style and reprinted. Finally, in response to repeated grower requests, the Program produced large and small dry-erase price paddles once again – this time with the "PA Produce" logo. These projects were all made possible with a matching grant from the Pennsylvania Department of Agriculture.

Point-of-purchase materials were shipped to about 240 growers across the state so far this year. Growers receive a credit equal to half of their assessment payment (up to a maximum of \$25) to order point-of-purchase items from the Program at no additional cost. Order forms are available on the PAVeggies.org website or by calling 717-694-3596.

### Impact of PA Veggies Social Media

Historically, there has not been much budget allocated to maintain social media but it does still serve as an important platform in distributing the Program's content and managing public relations. Takeovers and re-posting were both enlisted again to assist in the upkeep of the Program's most active social media platform, Instagram. Cross-posting techniques were utilized to ensure Facebook remained active as well. While both platforms continue to experience steady growth in followers, they also have both not been fully tapped for their marketing potential. From July 27, 2020 to October 27, 2020, we observed the following Facebook and Instagram statistics:

#### Facebook

- 15,243 reached
- 742 engaged
- 112 new likes/follows
- 609 video views
- 21,424 impressions
- 354 Facebook discussions that mentioned "PA Veggies"

#### Instagram

- 522 new follows (since end of Oct. 2019)
- 58,961 impressions
- 51,709 reached (last 6 months; posted 167 less times than 2019)
- 5,509 likes
- 171 posts (~6 months)



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## CRACKERJACK



### 80-82 Triploid Seedless Watermelon

Consistent yields over wide range of growing conditions. Very uniform fruit shape, firm flesh and deep red interior. If you are catering towards bins or cartons, this variety should definitely be on your farm. 13-17 lbs.

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### 105-110 Day Medium/Large Pumpkin

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High quality shipper ear with a short shank and sturdy plant. Great tipfill. Dark green husks with attractive flags. HR: Ps (Rp1G)

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## NEWS

## New FSMA Requirements for Additional Traceability Records for Certain Foods Proposed

The FDA is proposing to establish additional traceability recordkeeping requirements (beyond what is already required in existing regulations) for persons who manufacture, process, pack, or hold foods the Agency has designated for inclusion on the Food Traceability List. The proposed rule, “Requirements for Additional Traceability Records for Certain Foods” (Food Traceability Proposed Rule) is a key component of the FDA’s New Era of Smarter Food Safety Blueprint and would implement Section 204(d) of the FDA Food Safety Modernization Act (FSMA). When finalized, the proposal would standardize the data elements and information firms must establish and maintain, and the information they would need to send to the next entity in the supply chain to facilitate rapid and accurate traceability needed to prevent or mitigate foodborne illness outbreaks.

The proposed rule will be available for public comment for 120 days from the date of publication.

At the core of this proposal is a requirement for those who manufacture, process, pack or hold foods on the **Food Traceability List (FTL)** to establish and maintain records containing **Key Data Elements (KDEs)** associated with different **Critical Tracking Events (CTEs)**. While the proposed requirements would only apply to those foods on the FTL, they were designed to be suitable for all FDA-regulated food products. FDA would encourage the voluntary adoption of these practices industry-wide.

### Food Traceability List (FTL)

To determine which foods should be included on the Food Traceability List, the FDA developed a RiskRanking Model for Food Tracing. The risk-ranking model scores commodity-hazard pairs such as Shiga toxin-producing *E.coli* O157 and leafy greens or *Listeria Monocytogenes* and soft cheese according to data and information relevant to criteria described in a technical report, which is available to review on our website.

Using the results of the risk-ranking model, we tentatively identified foods for the Food Traceability List, as shown in Table 1.0. The term “Food Traceability List” (FTL) refers not only to the foods specifically listed, but also to any foods that contain listed foods as ingredients. Each proposed requirement described below therefore pertains to all such foods unless an exemption applies.

<b>Foods</b>	<b>Description</b>
Cheeses, other than hard cheeses	Includes all soft ripened or semi-soft cheeses, and fresh soft cheeses that are made with pasteurized or unpasteurized milk
Shell eggs	Shell egg means the egg of the domesticated chicken
Nut butter	Includes all types of tree nut and peanut butters; does not include soy or seed butters Cucumbers Includes all varieties of cucumbers
Herbs (fresh)	Includes all types of herbs, such as parsley, cilantro, basil
Leafy greens, including fresh-cut leafy greens	Includes all types of leafy greens, such as lettuce, (e.g., iceberg, leaf and Romaine lettuces), kale, chicory, watercress, chard, arugula, spinach, pak choi, sorrel, collards, and endive

Melons	Includes all types of melons, such as cantaloupe, honeydew, and watermelon
Peppers	Includes all varieties of peppers Sprouts Includes all varieties of sprouts
Tomatoes	Includes all varieties of tomatoes
Tropical tree fruits	Includes all types of tropical tree fruit, such as mango, papaya, mamey, guava, lychee, jackfruit, and starfruit
Fruits and Vegetables (fresh-cut)	Includes all types of fresh-cut fruits and vegetables
Finfish, including smoked finfish	Includes all finfish species, such as cod, haddock, Alaska pollack, tuna, mahi mahi, mackerel, grouper, barracuda, and salmon; except does not include siluriformes fish, such as catfish <sup>1</sup>
Crustaceans	Includes all crustacean species, such as shrimp, crab, lobster, and crayfish Mollusks, bivalves Includes all species of bivalve mollusks, such as oysters, clams, and mussels; does not include scallop adductor muscle.
Ready-to-eat deli salads	Includes all types of ready-to-eat deli salads, such as egg salad, potato salad, pasta salad, and seafood salad; does not include meat salads

<sup>1</sup>Data for catfish were excluded from the Risk-Ranking Model because siluriformes fish (such as catfish) are primarily regulated by the U.S. Department of Agriculture.

The proposed rule sets forth a process for the FDA to update the Food Traceability List if the agency concludes that updates are appropriate. Under that process, FDA would publish a notice in the Federal Register stating any proposed changes to the list and the reasons for the changes, and requesting information and views on the proposal. After considering any information or views submitted, the FDA would publish a second notice in the Federal Register, stating whether any changes are being made, and the reason for the decision. Any additions to the list would become effective one year after the date of the second Federal Register notice, unless otherwise stated. Any deletions from the list would become effective immediately.

### KEY FEATURES

#### 1. Critical Tracking Events

The proposed rule identifies growing, receiving, transforming, creating, and shipping as the CTEs for which records containing KDEs would be required. The KDEs required would vary depending on the CTE that is being performed. The records required at each CTE would need to contain and link the traceability lot code of the food to the relevant KDEs. Additional information regarding the KDEs we are proposing can be found in the proposed rule and at [FDA.gov](http://FDA.gov). Below is a brief description of each CTE.

#### Growing

For products such as fruits and vegetables, growing is generally the first step in the supply chain. In addition to the general KDEs for growing, sprout growers would be required to establish and maintain additional growing KDEs that are specific to sprouts.

*Continued on page 10*

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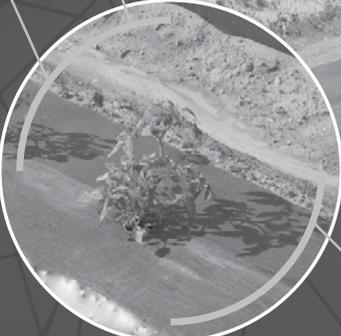
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## NEWS

## New FSMA Requirements for Additional Traceability Records for Certain Foods Proposed continued from page 8

### Receiving

Receiving is an event in a food's supply chain in which a food is received by a customer (other than a consumer) at a defined location after being transported (e.g., by truck or ship) from another defined location. In addition to the general KDEs for receiving, "first receivers" would need to establish and maintain additional KDEs.

- **First Receiver** A first receiver is the first person (other than a farm) who purchases and takes physical possession of a listed food. Only foods that are originated (i.e., grown, raised, caught, or, in the case of a non-produce commodity such as eggs, harvested) can have a first receiver. Listed foods that are created (such as a ready-to-eat deli salad that is not made from any listed ingredients) do not have a first receiver.

We introduced the category of first receiver in this proposed rule. We are proposing this category in part because on-farm activities can involve movement of a food between different entities (e.g., growers, harvesters, coolers) without sale of the food, and the relevant business relationships can be complex. In order to ensure that comprehensive records relating to the origination and initial handling of the food are maintained by a single person who both owns and possesses the food, the first receiver of the food was identified as the entity who would be responsible for maintaining certain KDEs relating to originated foods. First receivers are required to maintain different KDEs depending on whether the food was obtained from a fishing vessel or not.

### Creating

Creating is the making or producing of a food on the Food Traceability List (e.g., through manufacturing or processing) using

only ingredient(s) that are not on the Food Traceability List. Creating does not include originating or transforming a food.

### Transformation

Transformation is an event in a food's supply chain that involves changing a food on the Food Traceability List, its package, and/or its label (regarding the traceability lot code or traceability product identifier), such as by combining ingredients or processing a food (e.g., by cutting, cooking, commingling, repacking, or repackaging). Transformation does not include the initial packing of a single-ingredient food or creating a food.

### Shipping

Shipping is an event in a food's supply chain in which a food is arranged for transport (e.g., by truck or ship) from a defined location to another defined location at a different farm, a first receiver, or a subsequent receiver.

## 2. Traceability Program Records

In addition to requiring records of KDEs, as discussed above, the proposed rule would require persons who manufacture, process, pack or hold foods on the FTL to establish and maintain traceability program records. These records are intended to help regulators understand an entity's traceability program, and include:

- A description of relevant reference records  
A firm's KDEs might be kept on various types of reference records, such as bills of lading, purchase orders, or production logs. A firm's traceability program records would need to include

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## NEWS

a description of the reference records on which the firm maintains the required KDEs. This description would explain where on the reference record the traceability information appears, and if applicable, a description of how reference records for different tracing events for a food are linked.

- A list of foods on the FTL that are shipped  
The proposed rule would require anyone who ships food on the FTL to keep a list of which listed foods they ship, including the traceability product identifier and traceability product description for each food. This list would be part of a firm's traceability program records.
- A description of how traceability lot codes are assigned  
The proposed rule would require traceability lot codes to be established when a food on the FTL is originated, transformed, or created. The traceability lot code allows a food to be uniquely identified throughout the supply chain. As part of a firm's traceability program records, firms would be required to describe how they establish and assign traceability lot codes. Because of the crucial role that traceability lot codes play in the proposed rule, it is important that regulators know how a firm created and assigned these codes, so that they can better understand the scope of the records they are reviewing.
- Other information needed to understand data provided within the required records  
The proposed rule would require a firm's traceability program records to include any other information needed to understand the data within their traceability records, such as internal or external coding systems or classification schemes, glossaries, and abbreviations. This will help regulators understand the terminology, methods, and systems a firm uses in its traceability operations.

### 3. Additional Requirements

The proposed rule would also require that:

- records be maintained as either original paper records, electronic records, or true copies; they all must be legible and stored to prevent deterioration or loss.
- traceability records be provided to FDA as soon as possible but no later than 24 hours after a request is made.
- an electronic sortable spreadsheet containing relevant traceability information be provided to FDA within 24 hours of a request when necessary to assist FDA during an outbreak, recall or other threat to public health.

### Exemptions and Modified Requirements

The proposed rule includes exemptions for certain types of foods and certain persons who manufacture, process, pack or hold foods on the Food Traceability List. Some of these exemptions were provided by Congress, while others reflect the FDA's current thinking about the application of this rule to certain foods and persons.

Additional information regarding the exemptions we are proposing can be found in the proposed rule and on our website at [FDA.gov](http://FDA.gov). That said, stakeholders should take note of two proposals we are offering for how this rule would apply to small retail food establishments.

### Co-proposal for Small Retail Food Establishments

**Option 1 Full exemption:** RFEs that employ 10 or fewer full-time equivalent employees (FTEs) would be exempt from the requirements of the rule

**Option 2 Partial exemption:** RFEs that employ 10 or fewer FTEs would be exempt from the requirement to provide FDA, under specified circumstances, with an electronic sortable spreadsheet containing certain traceability information; however, they would be required to comply with all other aspects of the rule.

The FDA is interested in hearing from stakeholders regarding these options during the public comment period and public meetings.

In addition to the exemptions listed above, the proposed rule would allow the FDA, on its own initiative or in response to a citizen petition, to create modified requirements or exemptions if the FDA determines that the application of the relevant requirements to a given food or type of entity is not necessary to protect the public health. The proposed rule describes the process by which such modified requirements and exemptions can be requested. The proposed rule would also establish a process for the FDA to provide waivers when the agency determines that the application of the requirements would result in economic hardship for an individual entity or type of entity, due to the entity's unique circumstances.

## IMPLEMENTATION

### Compliance Dates

The FDA proposes that the final rule would become effective 60 days after it is published in the Federal Register.

Because an effective traceability system requires all entities in a supply chain to maintain traceability records, we believe all persons subject to the rule should come into compliance by the same date. We propose that the compliance date for all persons subject to the recordkeeping requirements would be 2 years after the effective date of the final regulation.

### Contact Us

The proposed rule will be available for public comment for 120 days from the date of publication. Comments should be submitted to [regulations.gov](http://regulations.gov). Meeting requests related to this rule should be submitted to [smarterfoodsafety@fda.hhs.gov](mailto:smarterfoodsafety@fda.hhs.gov). Additional questions related to this rule should be sent to the FSMA Technical Assistance Network.

### How to Submit a Comment:

Submit either electronic or written comments on the proposed rule by January 21, 2021.

The proposed rule was published in the Federal Register on September 23, 2020 (pages 59984-60038)

## NEWS

## Diversified Vegetable Apprenticeship Trains New Farmers

Pasa Sustainable Agriculture asked Master Grower Liz Krug and Apprentice Logan McCabe from Fullers Overlook Farm in Waverly, Pennsylvania about their experience participating in its Diversified Vegetable Apprenticeship program.

### Master Grower: Liz Krug

#### Why did you choose to become a master grower and host an apprentice?

We chose to become a master grower for two reasons:

1. We see the importance of training the next generation of farmers. Both of us learned how to farm from apprenticeships and found those experiences to be invaluable. The structure of the Diversified Vegetable Apprenticeship program worked well with us because it gave us the tools to make sure we are training the apprentices properly to start or manage their own farms.

2. As a business, having an apprentice for 18 months was extremely beneficial. The amount of time and energy spent on training an apprentice is a lot; so having them stay for 18 months was huge for us.

#### How has the program supported your personal goals and/or your farm?

Since we started Overlook seven years ago, we have taught and employed apprentices. Our own apprenticeship program has grown over the seasons and become more formalized, but Pasa's program really helped us make sure we were hitting certain marks with a guiding curriculum. The program supported us to make sure we were giving the apprentice the skills they need to be successful in their future, something that is extremely important to us but wasn't always clear we were achieving. The program's support also helped with supplemental trainings (tractor safety, business management, OSHA). Having the resources of an entire organization and the coordination/support from the apprenticeship's program manager helped us reach the goal of training the next generation of farmers.

#### What have you found challenging?

One challenge in the beginning was finding a way to support all of our apprentices' interests, knowledge and skill set; the apprenticeship curriculum; and balance that with the needs of a production farm. The other challenging aspect is not always feeling like a "master grower," because oftentimes, it feels like the more you know, the less you know. In farming, there is so much to learn — from soil health to growing in a changing climate to business management. That is one of the things we love about farming, you never stop learning and tweaking and adapting. That doesn't always lend to feeling like a master grower, but that in and of itself is a lesson I suppose.

#### What have you especially enjoyed?

We have enjoyed watching our apprentice Logan grow over the past two seasons, both in his knowledge and confidence in growing. We have seen him develop critical skills needed to manage a farm such as time management, harvest and quality control, food safety management, tool use and care, as well as many other necessary skills. We have also seen him able to influence positive decision making on other apprentices that may only be achieved through time spent farming in a production system.



## DIVERSIFIED VEGETABLE APPRENTICESHIP

Diversified Vegetable Apprenticeship pairs beginning farmers with established growers to provide a guided pathway toward managing or starting a vegetable farm.

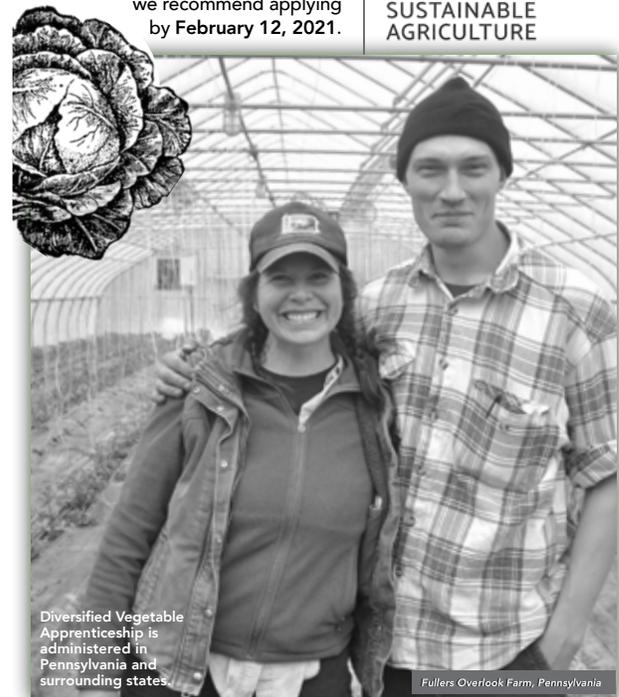
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#### What has surprised you about the experience?

How much we learned! Especially when going over the "whys" of things. As managers we knew why we make certain decisions in the field, why we grow certain crops, and why we make certain decisions in our business plan, but we might not have always communicated that clearly. Through the apprenticeship job skills list, we were able to flush out those "whys" a bit easier, which helped us be more effective teachers and concisely teach why something works here at Overlook. It also



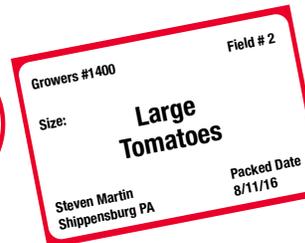
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## NEWS

## Diversified Vegetable Apprenticeship Trains New Farmers continued from page 12

allowed us to analyze our processes and systems during explanation and discussion. We realized through analysis that some things needed to be changed to allow for better management.

### What advice would you give to someone considering becoming a master grower?

Remember that you have 18 months to work through the job skills book. At the beginning it felt overwhelming to make sure we got through everything, but remember it doesn't all get done in one season. And having the monthly check-ins with Pasa's Diversified Vegetable Apprenticeship program manager helped a lot to make sure we were on the right track. On some of the items that we couldn't take time during the workday to explain or pay an apprentice to do, we started doing weekly lunch meetings. This helped us teach certain skills such as crop planning, business management, marketing plans, etc. and those "whys" behind things without the pressure of the time clock, and it empowered our apprentice Logan to take the lead in his learning.

### Apprentice: Logan McCabe

#### Why did you choose to become an apprentice?

I knew that I wanted to pursue agriculture for a living, and the Diversified Vegetable Apprenticeship promised to provide a comprehensive work/learning experience for those aspiring to manage their own farm. As opposed to seasonal work, where one might only be exposed to a few aspects of the farming operation, the work at [my host farm] Fullers Overlook along with the related technical instruction has provided a holistic experience of what small farm operation entails.

#### How is the program supporting your personal goals?

The program really tries to provide its apprentices with all the knowledge necessary to run their own farming operation. If something isn't covered at an apprentice's farm, [the Diversified Vegetable Apprenticeship program manager] goes out of their way to connect apprentices with resources and contacts in their field of interest.

#### What have you found challenging?

I was aghast the first time we had to terminate a crop. I thought "but all that food is going to waste!" I think this is a common reaction for those first getting into farming, who haven't yet had to triage crops and to do a cost-benefit analysis of salvaging a crop versus cutting losses and putting another crop in that space.

#### What have you especially enjoyed?

Besides the actual farming, the networking opportunities have been great. Through this program I've met many other young farmers. This lifestyle isn't for everyone, so it's been great to have a support network of people with similar lived experiences, frustrations, and aspirations.

#### What has surprised you about the experience?

Just how much there is to learn. Coming into the apprenticeship I had rudimentary knowledge of how to grow plants, with some hobby gardening under my belt, but I had really no idea of all of the "behind the scenes" stuff necessary to operate a farm: financials, marketing, social media presence, etc. While I think most of us prefer the actual growing of food to the above aspects of farming, they are essential for the sustainability of a farm — not just its growing practices, but its long-term financial viability as a business.

### How do you plan to utilize your experience after you complete the program?

I think the end goal of most farmers is to have their own farm, and I include myself in that group. In the meantime, though, I am currently looking for job opportunities on small farms as a crew leader or manager.

### What advice would you give to someone considering becoming an apprentice?

If you are sure that you want to live the life of a small farmer, I'd say the Diversified Vegetable Apprenticeship program is a great first step. If you still have some hesitations though, there are other options before you take the plunge into an 18-month apprenticeship. My first experience with farming was in the WWOOFing (World Wide Opportunities on Organic Farms) program, which is a network of farms that host volunteers for workshare. Depending on the farm, you can volunteer anywhere from a day to a whole season, so it's a flexible and low-stakes way to dip your toe into farming. Another option is working on a farm for a season; many farms predominantly employ seasonal help. So you could work for a summer, and if you haven't been scared off yet, look into pursuing an extended apprenticeship like this program.

If you're interested in joining Pasa Sustainable Agriculture's Diversified Vegetable Apprenticeship program by applying to become either a master grower or apprentice, you can learn more by visiting [pasafarming.org](http://pasafarming.org) or contacting program manager Dan Dalton by email at [dan@pasafarming.org](mailto:dan@pasafarming.org) or calling 814.349.9856 x710.

The Wage and Hour Division has made available a new farm worker rights poster in English and Spanish at: [https://www.dol.gov/sites/dolgov/files/whd/publications/Farm\\_Worker\\_Rights\\_Flyer.pdf](https://www.dol.gov/sites/dolgov/files/whd/publications/Farm_Worker_Rights_Flyer.pdf). The flyer can be posted in establishments that farmworkers might frequent and it gives them notice of their rights and where to file a complaint.

# RAISING THE BAR

While its "dirty brown" exterior may not be what consumers are used to seeing, its true beauty is on the inside. **Ugly Dumpling** is one of the best tasting winter squash varieties you will ever eat. This new **Rupp** exclusive is also a great option for fall decoration.

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## NEWS

## National News Briefs

### Adverse Effect Wage Rate Frozen for Two Years

The Department of Labor announced it will stabilize the wages paid to guest farmworkers. The Adverse Effect Wage Rate (AEWR) will remain at 2020 rates for the next two years.

"Farmers are committed to paying their employees a fair wage, but the existing system sets unpredictable rates that make it hard for farmers to remain competitive," said American Farm Bureau Federation President Zippy Duvall. "The Department of Labor's decision to maintain current pay rates for the next two years for the majority of H-2A employers provides stability during the uncertainty created by the pandemic and trade imbalances. While this decision does not solve all of the wage issues, it is a step in the right direction. We look forward to continuing our work on meaningful agricultural labor reform through the regulatory or legislative processes."

The final rule no longer uses USDA's Farm Labor Survey for workers who fall under core farm occupations. The survey-based wage methodology led to drastic swings from year-to-year. The new rule allows farmers to plan for the year ahead without having a drastic increase in wages at the beginning of the year.

From **Farm Bureau Express**, Penna. Farm Bureau, Nov. 13, 2020.

### EPA Approves New Dicamba Registrations

The U.S. Environmental Protection Agency has approved new five-year registrations for two products containing the herbicide dicamba and extended the registration of a third.

The move comes after EPA went back to the drawing board following a federal court ruling in June that vacated the registrations of three dicamba products and disrupted farmers' plans in the middle of the planting and growing season.

EPA's recent action approves new five-year registrations of two of the products affected by the court ruling— XtendiMax with VaporGrip Technology and Engenia Herbicide—for over-the-top use on dicamba-tolerant soybeans and cotton only and extended the registration of another dicamba product, Tavium Plus VaporGrip Technology, until 2025. At the same time, EPA updated its regulations related to the registrations in an effort to address the federal court's concerns related to off-site movement of the herbicide and potential effects on endangered or threatened species.

New requirements for the dicamba products include:

- Requiring an approved pH-buffering agent (also called a Volatility Reduction Agent) to be tank mixed with the products prior to application.
- Requiring a downwind buffer of 240 feet and 310 feet in areas where listed species are located.
- Prohibiting OTT application of dicamba on soybeans after June 30 and cotton after July 30.
- Simplifying the label and use directions so that growers can more easily determine when and how to properly apply dicamba.

EPA said it developed the new registrations after it "reviewed substantial amounts of new information and conducted assessments based on the best available science." The new requirements were developed with input from state regulators, grower groups, academic researchers, pesticide manufacturers, and others.

From **Farm Bureau Express**, Penna. Farm Bureau, Oct. 30, 2020.

### Senate Committee Releases Agriculture Spending Plan

The U.S. Senate Appropriations Committee has released its proposal for funding agriculture programs through the 2021 federal fiscal year.

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The fiscal year began Oct. 1; however, the federal government is operating on a continuing resolution that keeps it funded through Dec. 11.

The Senate's proposal includes \$23.33 billion in discretionary funding for agriculture, including funding for agriculture research, FSA programs, rural development, Animal and Plant Health Inspection Service, Food Safety and Inspection Service, the Food and Drug Administration and more. The measure also includes a Farm Bureau-supported provision that would prohibit the U.S. Department of Transportation from enforcing electronic logging devices on livestock and insect haulers.

Farm Bureau is reviewing the Senate plan and will work with both the House and Senate to secure agriculture's priorities as they begin negotiating an omnibus spending bill.

From **Farm Bureau Express**, Penna. Farm Bureau, Nov. 13, 2020.

Continued on page 18

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## NEWS

**National News Briefs** *continued from page 16***New Farm Bureau Program Mentors Veteran Farmers**

The Farm Bureau Patriot Project is a mentorship program that connects military veteran beginning farmers with experienced Farm Bureau member farmers. The program was piloted in Arkansas and Texas in 2016 and is now available as a program option to all state Farm Bureaus.

Through the Farm Bureau Patriot Project, American Farm Bureau Federation works with state Farm Bureaus to identify military veterans and Farm Bureau mentors and facilitate long-term mentorship relationships.

“Many people don’t realize that 44 percent of military personnel come from rural communities,” said American Farm Bureau Federation President Zippy Duvall. “The men and women who worked so hard to defend our national security are fully equipped to ensure our food security. Our military veterans come back home to their communities equipped with discipline, determination and the willpower to do very difficult things. And farming is a difficult occupation.”

In addition to the Patriot Project, Farm Bureau supports veterans’ involvement in agriculture through its partnership with the Farmer Veteran Coalition. FVC is the nation’s largest nonprofit organization assisting veterans and active duty members of the U.S. armed forces embark on careers in agriculture.

Pennsylvania Farm Bureau also helps support veteran farmers in the Keystone State through the Pennsylvania Veteran Farming Project, which works in partnership with the Pennsylvania Friends of Agriculture Foundation (PFB’s charitable foundation) and USDA to provide resource referrals, education, and connections for military veterans who are beginning farming.

*From Farm Bureau Express, Penna. Farm Bureau, Nov. 13, 2020.*

**State News Briefs****General Assembly Passes Agritourism Liability Bill**

The state Senate amended the language of HB 1348 into HB 1737 on November 18, a bill that only addressed limiting environmental liability for economic development agencies, financiers and fiduciaries. The amended bill provides “particular rights and immunities, providing for economic development agency, fiduciary and lender environmental liability protection, for agritourism activity protection and for COVID-19-related liability and making a related repeal.” It passed the Senate primarily with Republican votes. On November 19, the state House concurred with the amended bill with only Republican votes. The agritourism liability language in this bill approved by the General Assembly would limit the liability of farms offering agritourism activities. This protection would be similar to the current state law that limits the liability of businesses that offer equine activities. The language still provides consumers with protection against gross negligence on the part of the agritourism provider, but provides the farm some protection against frivolous lawsuits over hazards that are inherent with a farm setting. However, the bill faces an uncertain future with the Governor since it includes other issues that the Democrats in the legislature opposed.

**Broadband Bill Signed by Governor**

A bill that aims to expand access to high-speed internet in rural communities—one of Pennsylvania Farm Bureau’s chief legislative priorities—is now law.

House Bill 2438, sponsored by Rep. Clint Owlett of Tioga County, cleared the General Assembly recently and was signed by Gov. Tom Wolf this week.

The measure makes it easier for rural cooperatives to offer broadband service by allowing them to use their existing utility



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## NEWS

easements to install fiber-optic lines without having to renegotiate agreements. Cooperatives would still have to renegotiate if the installation of broadband service results in the need for new infrastructure, such as new poles.

Expanding broadband access is among Pennsylvania Farm Bureau's chief legislative priorities. While high-speed internet is becoming more and more essential to agriculture, business and daily life—a reality underscored by the COVID-19 pandemic—many rural communities lack adequate access.

PFB believes that electric cooperatives can play an important role in providing internet service to rural communities.

*From Farm Bureau Express, Penna. Farm Bureau, Oct. 30, 2020.*

### MAV Width Bill Signed Into Law

A Farm Bureau-supported bill that would change the state's vehicle code regarding the width of multipurpose agricultural vehicles (MAVs), commonly known as ATVs or side-by-sides, has become law.

Gov. Tom Wolf this week signed Senate Bill 995, sponsored by Sen. Dan Laughlin of Erie County, following its passage by the state House. The state Senate passed the bill earlier this year.

Currently, the state vehicle code requires that MAVs be no wider than 62 inches; however, newer models of side-by-sides are often up to 66 inches wide. Senate Bill 995, changes the vehicle code definition of an MAV to include vehicles up to 66 inches wide.

Farmers are allowed to operate MAVs in a limited capacity on roadways as part of their farming operations. Pennsylvania Farm Bureau wanted to make sure that farmers who had newer models of MAVs would still be able to legally move those vehicles on the road.

*From Farm Bureau Express, Penna. Farm Bureau, Oct. 30, 2020.*

### PASS Survey

Please complete a brief survey to help Feeding Pennsylvania more efficiently collaborate with Pennsylvania farmers and processors through the PASS program, which improves farm commodity sales while providing food for those at risk of hunger. Complete the survey at <https://www.surveymonkey.com/r/LKXCL38> to be entered to win a \$50 Visa gift card. Previous PASS vendors should email Feeding PA at [tmainzer@feedingpa.org](mailto:tmainzer@feedingpa.org) instead of participating.

*From Farm Bureau Express, Penna. Farm Bureau, Nov. 13, 2020.*

### New Program to Help Agriculture Businesses Navigate Pandemic

The Penn State Small Business Development Center and partner programs at Clarion University and The University of Scranton are launching a new Pennsylvania Small Business Development Centers Agriculture Center of Excellence, a joint initiative to help Pennsylvania agriculture businesses sustain operations and stabilize food supply chains in the wake of the COVID-19 pandemic.

The program will offer training and assistance to help agriculture businesses manage their finances, improve their businesses and navigate the aid programs and new health and safety considerations related to the pandemic.

For more information, visit <https://sbdc.psu.edu/about/pasbdc-agriculture-center-of-excellence/>

*From Farm Bureau Express, Penna. Farm Bureau, Nov. 13, 2020.*

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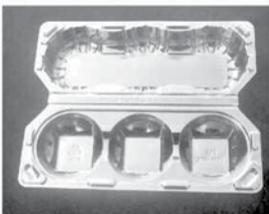
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## CONVENTION

### Mid-Atlantic Fruit and Vegetable Convention to Go Virtual for 2021 continued from page 1

#### If I miss the Convention dates, will I still need to register and pay to see the recordings of the educational sessions?

Yes, only people registering and paying the \$40 fee will have access to the session recordings, trade show and posters on the virtual Convention website even after February 11. There are substantial costs involved in presenting the Convention virtually that the Convention Joint Committee is hoping to cover.

#### Is there a discount for being a member of one of the sponsoring organizations?

Not this year – we purposely are keeping the registration fee to a minimum to enable and encourage as many growers as possible to participate in this year's virtual event – but PLEASE, PLEASE, PLEASE remember that your association needs your continued membership to continue to serve you this year and in the coming years. The fact that the in-person Convention in Hershey is not being held this year is a major financial loss to your association so it is very critical that growers continue to support their associations with their membership dues in 2021.

#### Will there be a printed program to see what topics and speakers are on the schedule?

While we are including a tentative program in this issue of the newsletter, the virtual Convention website will have the final

program in a format that you can print out to plan which sessions you want to participate in.

#### Will I be able to get pesticide credits?

We are planning to be able to offer pesticide credits for Pennsylvania, Maryland and New Jersey growers as we usually do. Please note that each individual seeking to get pesticide credits will need to register separately and pay the \$40 fee. You will enter your pesticide license number and other contact information when you register. The educational sessions will be offered from the Zoom platform, which allows us to have a record of who is logged on during each presentation that qualifies for a pesticide credit. So just like the in-person event, you will need to be "present" (logged-in) during the particular presentations that qualify for core and category credits.

#### How will the trade show work?

Instead of walking up and down the aisles of the Great American Hall or the Aztec Room, you will go to the trade show page on the virtual Convention website and pick which exhibitors you have an interest in "visiting". They will be grouped by the kind of products or services they offer. When you click on an exhibitor's booth, you will be able to see a description/pictures of their products or services plus, if the exhibitor desires, any special show deals they are offering, product demonstration videos, or virtual chat portals to enable you to interact with the exhibitor in real time.

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## CONVENTION

Exhibitors are most likely to be available for live chats during the period from 11:00 a.m. to noon the Tuesday and Thursday of the Convention although they can set additional hours. Their booths will be available to visit 24/7 from February 8 to March 31, 2021.

### Will all the regular exhibitors be in the virtual trade show?

All the exhibitors at the 2020 Mid-Atlantic Convention were invited to participate in the virtual trade show. While many long-time exhibitors will be part of the virtual event, some have chosen not to have a virtual booth. We are encouraging them to at least be a sponsor or an advertiser on the virtual Convention website. But one advantage of virtual trade show is that, unlike an in-person trade show, there are no space limitations to the number of exhibitors. So we are hoping to be able to include some new exhibitors that have been on our waiting list for the in-person events.

### What are research posters?

At the Hershey Lodge, you may have noticed posters on easels lining the hallway outside the Nigerian and Trinidad Rooms. These posters report on the research work of graduate students and other researchers whose work is supported by industry and/or not included on the program otherwise. The virtual Convention offers the opportunity for researchers to present this type of information in a printed form with text and pictures that in many ways may be more convenient for growers to view online at their leisure rather than standing in front of an actual poster in a crowded hallway at Hershey. There will be a page on the virtual Convention website that will list these research posters.

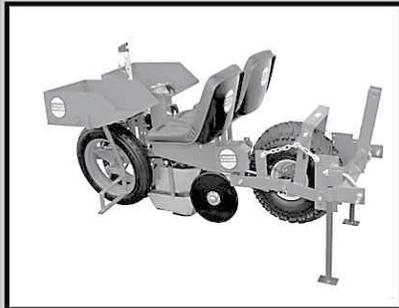
### Will there be written Proceedings?

No, we will not be producing a printed Proceedings booklet with summaries of the vegetable, potato, small fruit and market session presentations. Since the educational sessions will be recorded and available through the end of March to all persons registered for the Convention, it was not felt necessary to produce this booklet this year.

The Mid-Atlantic Convention has been jointly sponsored by the State Horticultural Association of Pennsylvania, the Pennsylvania Vegetable Growers Association, the Maryland State Horticultural Society and the New Jersey State Horticultural Society for the past 43 years making this year's Convention the 44th meeting. In 2014, the Virginia State Horticultural Society also began meeting at the Convention. The Pennsylvania State University, University of Maryland, Rutgers University Cooperative Extension and Virginia Tech University all assist in organizing the educational sessions.

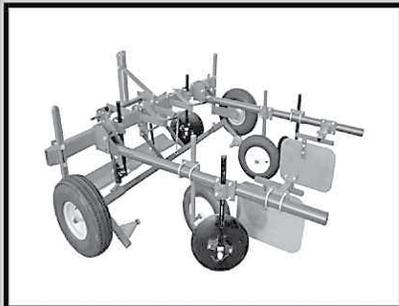
The Convention has become one of the premier grower meetings in the Northeast. The educational program covers nearly every aspect of fruit, vegetable, potato and berry production. Commercial growers should not pass up this terrific educational opportunity. We hope this year's program, despite its virtual format, continues our standard of a world-class grower educational meeting. So do yourself a favor and make a sound investment in your business by attending the 2021 Mid-Atlantic Convention - virtually.

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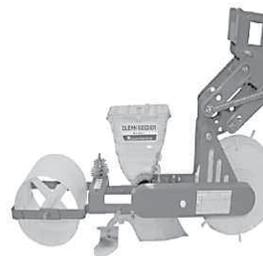
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## CONVENTION

# 2021 Mid-Atlantic Fruit and Vegetable Convention Program

### Monday, February 8, 2021

9:00 to 11:00/11:15 AM

#### 110 Wholesale Marketing

9:00 To Be Announced

#### 120 Third Party Liability

9:00 To Be Announced

#### 130 General Vegetables

9:00 **Precision Restoration of the Soil Microbial Rhizosphere Ecosystem** - Richard Woodward, Texas A&M Univ.

9:45 **Anaerobic Soil Disinfestation: A Regenerative Approach for The Management of Soilborne Pests and Pathogens** – Erin Roskopf, USDA-ARS

10:30 **Questions and Answers with Speakers**

12:00 noon to 2:00/2:15 PM

#### 210 Hydroponics/Greenhouse Vegetables

12:00 **Plant Nutrition for Hydroponic Lettuce** - Neil Mattson, Cornell Univ.

12:30 **Water and Nitrogen Management and Use Efficiency of Hydroponic Leafy Vegetables** – Daniel Leskovar, Texas A&M Univ.

1:00 To Be Announced

1:30 **Agronomic Biofortification of Soilless Vegetables for the Production of Functional Greens** – Dr. Francesco Di Gioia, Penn State Univ.

#### 220 Honeybees for Pollination

12:00 To Be Announced

#### 230 Post-Harvest Food Safety

12:00 **Food Safety Concerns of Packing Equipment** - Chris Callahan, Univ. of Vermont

12:45 **FSMA Update on Traceability and/or Water Use Regulations** – Dr. Emily Greip, United Fresh Produce Association

1:30 **FSMA Inspection Update** – Penna. Dept. of Agric.

2:30 to 4:30/4:45 PM

#### 310 Creative Marketing

2:30 To Be Announced

#### 0320 Ag Workplace/Legal Compliance COVID-19 –

2:30 To Be Announced

#### 0330 Specialty Vegetables

2:30 **Mid-Atlantic (NE) Demand for Ethnic Produce** - Dr. Ramu Govindasamy, Rutgers Coop. Extension

3:15 **Baby Hemp as a New Salad Green** – Dr. Neil Mattson, Cornell Univ.

3:45 **Asian Vegetable Variety Selection and Production** - Dr. Lewis Jett, West Virginia Univ.

### Tuesday, February 9, 2021

9:00 to 11:00/11:15 AM

#### 0410 Sweet Corn

9:00 **\*\*The Worker Protection Standard and the AEZ Change** - James Harvey, Penn State Univ.

9:30 **\*IPM in Sweet Corn - Practices and Resources: Plus an App for That** - Marion Zuefle, Cornell Univ.

10:15 **\*Ear-Feeding Insect Control** – Dr. David Owen, Univ. of Delaware

#### 0420 Economies of Online Sales

9:00 To Be Announced

#### 0430 Tree Fruit Entomology

9:15 **\*Get Ready for the Big 10 in 2021: Periodical Cicada Brood 10 That Is** - Dr. Chris Bergh, Virginia Tech

9:45 **\*Recent Progress on Preventing Ambrosia Beetle Attacks in Apple Plantings; plus, the NEWA Rebuild and Updated Insect Prediction Models** - Dr. Arthur Agnello, Cornell Univ.

10:15 **\*Codling Moth and Oriental Fruit Moth Are Back - Are You Ready?** - Dr. Greg Krawczyk, Penn State Univ.

10:45 **\*Rainfast, Persistence & Performance Attributes of Insecticides for Tree Fruit IPM** - Dr. John Wise, Michigan State Univ.

12:00 noon to 2:00/2:15 PM

#### 0510 Soil Health/Cover Crops

12:00 To Be Announced

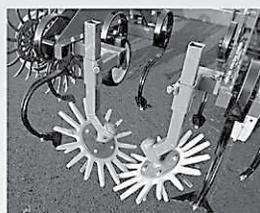
#### 0520 E-Commerce

12:00 To Be Announced

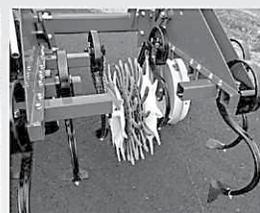
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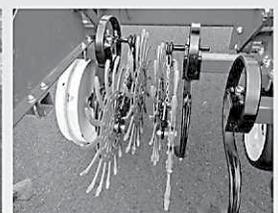
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# CONVENTION

## 2021 Mid-Atlantic Fruit and Vegetable Convention Tentative Educational Program Outline

9:00-11:00/11:15	12:00-2:00/2:15	2:30-4:30/4:45
<b>Monday, February 8, 2021</b>		
Wholesale Marketing	Hydroponics/Greenhouse Vegetables	Creative Marketing
3rd Party Liability	Honeybees for Pollination	Ag Workplace/Legal Compliance COVID-19
General Vegetables	Post-Harvest Food Safety	Specialty Vegetables
<b>Tuesday, February 9, 2021</b>		
Sweet Corn	Soil Health/Cover Crops	Organic Vegetable Production
Economies of Online Sales	Lunch/Learn - Vegetables	General Vegetables
Tree Fruit	E-Commerce	Tree Fruit
<b>Wednesday, February 10, 2021</b>		
Pepper/Eggplant/Cole Crops	Vegetable Biocontrols	Farm Markets Post-Covid
Small Fruit	Agritourism	Small Fruit
Tree Fruit	Lunch/Learn - Tree Fruit	Tree Fruit
Vine Crops	Tomatoes	General Vegetables
		Spanish
<b>Thursday, February 11, 2021</b>		
High Tunnels	Pumpkins/Winter Squash	General Vegetables
Potatoes	Potatoes	Potatoes
Tree Fruit	Digital/Social Marketing	Tree Fruit
Small Fruit	Lunch/Learn - Berries	Small Fruit
CSAs		



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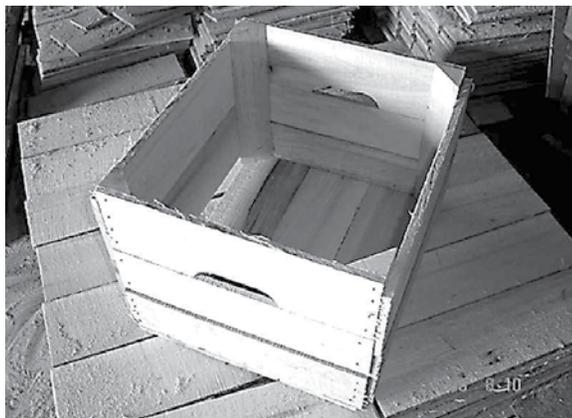



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## Mid-Atlantic Convention Program

*continued from page 22*

### 0530 Lunch/Learn - Vegetables

12:00 Open Roundtable Discussion on Vegetable Production

**2:30 to 4:30/4:45 PM**

### 0610 Organic Vegetable Production

2:30 To Be Announced

3:00 To Be Announced

3:30 To Be Announced

4:00 Reducing Tillage in Organic Vegetable Systems – Erin Silva, Univ. of Wisconsin

### 0620 General Vegetables

2:30 **Compact Bed Geometry: An Effective Strategy to Reduce Costs and Risks and Improve Sustainability for the Vegetable Plasticulture Systems** - Prof. Sanjay Shukla, Univ. of Florida

3:15 **Protecting Water Resources During Mixing and Loading** – Ryan Selking, Penn State Univ.

3:45 **Biodegradable Plastic Mulch** – Prof. Carol Miles, Washington State Univ. (invited)

### 0630 Tree Fruit: Plant Health

2:30 **\*Biology & Management of Bitter Rot of Apple** - Phillip Martin

3:00 **\*Alternative Controls for Apple Replant Disease – Using Carbon Applications to Shift to Beneficial Root Microbiomes** - Tianna DuPont, Washington State Univ.

3:45 **\*Rizophagy: How Plants Farm Microbes** - Dr. James White, Rutgers Univ.

4:40 SHAP Annual Business Meeting

## Wednesday, February 10, 2021

**9:00 to 11:00/11:15 AM**

### 0710 Vine Crops

9:00 **Seedless Watermelon Variety Trial Results** – Dr. Gordon Johnson, Univ. of Delaware

9:30 **Vertical High Tunnel Specialty Melon Production: Variety Performance, Food Safety and Consumer Response** – Petrus Langenhoven, Purdue Univ.

10:00 **\*Understanding Root Diseases of Vine Crops** - Anthony Keinath, Clemson Univ.

10:30 **\*\*Pesticides and Pollinators** – Jamie Kopco, Penn State Univ.

### 0720 Cole Crops

9:00 To Be Announced

### 0730 Small Fruit

9:00 **\*How Did I Get Anthracnose in My Strawberry Field?** - Phillip Martin and Kathy Demchak, Penn State Univ.

9:30 **\*Strawberry Diseases: Current Issues and Management** - Dr. Mengjun Hu, Univ. of Maryland; Kathy Demchak, Penn State Univ.; Dr. Andrew Wyenandt, Rutgers Univ.

10:15 **Matted-Row vs. Plasticulture Strawberries: What Works Best on our Farm and Why** – John Shenk, Shenk's Berry Farm; Wade and Ben Butler, Butler's Orchard; Michael Groszkiewicz, Mason Farms

### 0740 Tree Fruit: Horticulture/Physiology

9:00 **George Goodling Lecture: Honeycrisp Nutrition to Reduce Bitter Pit** - Dr. Lailiang Cheng, Cornell Univ.

9:45 **\*\*Protecting Water Resources During Mixing and Loading** - Ryan Selking, Penn State Univ.

10:15 **Effect of Rootstocks on the Quality Characteristics of Honeycrisp Fruit** - Dr. Macarena Farcuh, Univ. of Maryland

## CONVENTION

10:35 **Use of Reflective Materials & Other Technologies to Improve Fruit Color in High Value Apple Cultivars** - Dr. Mario Miranda Sazo, Cornell Univ.

**12:00 noon to 2:00/2:15 PM**

### 0810 Tomatoes

12:00 **Building a Tomato Nutrition Program From the Soil Up** - Steve Bogash Marrone Bio  
 12:45 **The Potential for Implementing Nano-Technology-Based Approaches in Plant Disease Management** - Dr. Mathews Paret, Univ of Florida  
 1:30 **BioUnite™ - The Integration of Biological and Chemical Controls to Manage Insects and Diseases on Tomatoes** - Dr. Timothy Johnson, Marrone Bio Innovations

### 0820 Vegetable Biocontrols

12:00 **To Be Announced**

### 0830 Agritourism

12:00 **Legal Considerations for Agritourism** - Jacqueline Schweichler, Penn State Univ.  
 12:30 **Agritourism Online Customer Experience Best Practices** - Sarah Cornelisse, Penn State Univ.  
 1:00 **Best Practices for Developing Agritourism Trails** - Claudia Schmidt, Penn State Univ.  
 1:30 **Lessons Learned from COVID-19 and the Way Ahead for Agritourism** - Hugh McPherson, MaizeQuest

### 0840 Lunch/Learn Tree Fruit

12:00 **Color Enhancing Technologies** - Color Enhancing Technologies - Grower Panel  
 12:45 **Evaluating the Use of Reflective Groundcovers on Fruit Quality of Honeycrisp and Fuji Apple Cultivars in the Mid-Atlantic** - Dr. Macarena Faruh - Univ. of Maryland  
 1:30 **Grower Discussion**

**2:30 to 4:30/4:45 PM**

### 0910 General Vegetables

2:30 **Snap Beans**- Julie Kikkert, Cornell Coop. Extension  
 3:00 **Onion Variety Results** - Thomas Butzler and Timothy Elkner, Penn State Extension  
 3:30 **Watermelon & Melon Grafting** - Carol Miles, Washington State Univ.

### 0920 Farm Markets Post-COVID

2:30 **To Be Announced**

### 0930 Small Fruit

2:30 **What's New in Blackberry Varieties from the Univ. of Arkansas** - Dr. John Clark, Univ. of Arkansas  
 3:00 **\*Weed Control in Brambles** - Dr. Eric Hanson, Michigan State Univ. (emeritus)  
 3:45 **What We Learned about Pick-Your-Own in 2020** - Kurt Alstede, Alstede Farms; Craig Pallman, Pallman Farms; Guy Moore, Larriland Farm

### 0940 Stone Fruit

2:30 **\*\*Pollinator Protection** - Jamie Kopco, Penn State Univ.  
 3:00 **Ernie Christ Memorial Lecture: Developing New Peach Cultivars for the Eastern U.S.** - Dr. Ksenija Gasik, Clemson Univ.  
 3:45 **Opportunities & Growth for the Peach Industry: A Look at Market Impacts to Selling Peaches** - Kay Rentzel, National Peach Council  
 4:15 **\*Fall Application of Ethephon for Bloom Delay in Peach & Sweet Cherry: Pros & Cons** - Dr. Sherif Sherif, Virginia Tech Univ.

*Continued on page 26*

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## MARKETING

### Mid-Atlantic Convention Program *continued from page 25*

#### 0950 Spanish

- 2:30 **Keys to Success in Planting, Establishing, and Tree Training in Orchards during the First Year** - Mario Miranda Sazo, Cornell Coop. Extension
- 3:30 **Sergio and Silvia—The Rosario Team** - Sergio Rosario and Silvia Rosario, co-founders and co-owners of Rosario Brothers LLC, an agricultural company for contract tree pruning/grafting/budding

#### Thursday, February 11, 2021

9:00 to 11:00/11:15 AM

#### 1010 High Tunnels

- 9:00 **Nitrogen Input Effects on Yield and Quality of Grafted and Non-Grafted Tomato Grown in High Tunnels** - Dr. Francesco Di Gioia and Andrew Blunk, Penn State Univ.
- 9:45: **\*\*Best Practices to Limit Phytotoxicity from Pesticides on High Tunnel Crops**— Thomas Ford, Penn State Univ.
- 10:15 **Opportunities for Growing Grafted Cucumbers in High Tunnels** – Dr. Wenjing Guan, Purdue Univ.

#### 1020 Potatoes

- 9:00 **Cover Crops and Potatoes**- John Jemison, Univ. of Maine
- 9:30 **\*Blackleg, Stem Rots, Dickeya, Pectobacterium, Bacterial Soft Rot** – Dr. Steve Johnson, Univ. of Maine
- 10:00 **Growing Russets in PA - Can it be Done?** – Robert Leiby, PA Coop. Potato Growers
- 10:20 **PA Potato Variety Trials** – Xinchun Qu, Penn State Univ.
- 10:40 **Potato Issues in 2020 and What Can We Expect in 2021** – Robert Leiby, PA Coop. Potato Growers

#### 1030 Small Fruit – Blueberries

- 9:00 **\*\*Pollinator Protection** - Leah Fronk, Penn State Extension
- 9:30 **To Be Announced**
- 10:00 **\*Blueberry Root and Cane Diseases** – Dr. James Polaschok, USDA-ARS,
- 10:30 **How Blueberry Cultivars with Southern Highbush Backgrounds Access Nutrients Differently than Standard Varieties in Upland Soils** - Dr. Chris Walsh, Univ. of Maryland

#### 1040 Tree Fruit: Ag Engineering

- 9:00 **\*\*Utilizing Intelligent Sprayers Benefit Growers and the Environment** - Dr. Heping Zhu, USDA-ARS & Steve Booher, Smart Guided Systems.
- 9:30 **Computer Vision & Drone Imaging in Apple Orchards** - Dr. Dana Choi, Penn State Univ.
- 9:50 **Precision Irrigation Systems for Tree Fruit Production** - Dr. Long He, Penn State Univ.

#### Lightning Talks

- 10:10 **Concept Design of an Integrated Robotic Pruner for Apple Tree Pruning** - Azlan Zahid, Penn State Univ.
- 10:20 **Measuring Accurate Tree Canopy Density for Developing a Precision Spraying System** - Md Sultan Mahmud, Penn State Univ.
- 10:30 **UAV-Based Heating Requirement Determination for Frost Management in Apple Orchards** - Wenan Yuan, Penn State Univ.
- 10:40 **Fall Foliar Nutrition Programs: What is Really Needed?** - Dr. Lailiang Cheng, Cornell Univ.

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## VEGETABLE PRODUCTION

### 1050 CSAs

9:00 **To Be Announced**

**12:00 noon to 2:00/2:15 PM**

### 1110 Pumpkins/Winter Squash

12:00 **\*Management Considerations for Downy Mildew and Plectosporium Blight on Pumpkin** - Dr. Beth Gugino, Penn State

12:30 **It All Started with Pumpkins & Strawberries** - Bruce Hellerick, Hellerick's Family Farm

1:00 **\*Review of Weed Control in Pumpkin** - Dwight Lingenfelter, Penn State Univ.

1:30 **\*Integrated Pest and Pollinator Management (IPPM) in Pumpkins** - Dr. Shelby Fleischer, Penn State Univ.

### 1120 Potatoes

12:00 **\*Designing a Fungicide Program for Potatoes** - Dr. Steve Johnson, Univ. of Maine

12:30 **PotatoesUSA** - Blair Richardson, PotatoesUSA

12:50 **National Potato Council** - Mike Wenkel & Kam Quarles, National Potato Council

1:10 **PA Cooperative Potato Growers**, Nathan Tallman, PA Coop. Potato Growers

1:30 **\*\*Core Credit Potatoes** - Duane Miller, Penn State Univ.

### 1130 Lunch/Learn - Small Fruit

12:00 **Strawberry Grower Discussion: 2020 Issues and Experiences** - moderated by Kathy Demchak and Robert Pollock, Penn State Extension

1:00 **Blueberry Grower Discussion: New and Recurring Challenges** - moderated by John Esslinger and Kathy Demchak, Penn State Extension

### 1140 Digital/Social Marketing

12:00 **Social Selling**, Sarah Cornelisse, Penn State Univ.

12:30 **Email Marketing**, Ginger S. Myers Univ. of Maryland Extension

1:00 **Become a Social Agriculture Advocate!** Michele Wal-fred, Univ. of Delaware

1:30 **Making Videos for Social Outlets**, Peter Coffey Univ. of Maryland Extension

**2:30 to 4:30/4:45 PM**

### 1210 General Vegetables

2:30 **Developing Sensor-Based Smart Irrigation Systems for Vegetable Crops** - Long He, Haozhe Zhang, Penn State Univ.

3:00 **Decision Support Systems for the Rational Site-Specific Management of the Fertigation of Tomato** - Antonio Elia, Univ. of Foggia

3:45 **Application of Sensor-Based Automated Irrigation and Decision Support System for the Fertigation Management of Fresh-Market Tomato in Pennsylvania** - Francesco Di Gioia, Haozhe Zhang, Long He, Antonio Elia Penn State Univ./Univ. of Foggia

4:15 **Panel Discussion**

### 1120 Potatoes

2:30 **\*Managing Diseases in Potato Storages** - Todd For-bush, Techmark, Inc.

3:15 **Improving Soil Health While Growing Potatoes** - Dr. John Jemison, Univ. of Maine

4:00 **\*Potato Insect Control Update** - Dr. Thomas Kuhar, Virginia Tech

### 1230 Small Fruit - Blueberries

2:30 **How to Reduce Soil pH and Maintain It in a Good Range for Blueberries** - Dr. David Bryla, USDA-ARS

*Continued on page 34*

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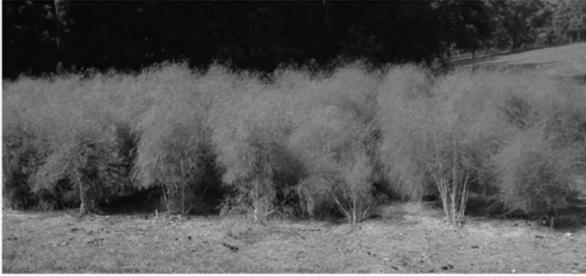
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## Winter High Tunnel Environment: Limiting Factors to Growth

Andy Radin

Your tunnel plantings have all popped and they've been growing. The warm weather has been great. But it's getting darker. And the growth is slowing. Here comes cold. You're probably wishing you seeded just a week earlier. But you can't turn back the clock. Are you doomed?

Here are the environmental parameters that affect your winter crops, ways to modify the environment, and some trade-offs.



A high tunnel, nestled in a cold spot on a farm, with snow clinging to the plastic. Photo: A. Radin

**Light is the most limiting factor.** If you want plant growth in the winter, you'll have to be understanding of the fact that light is the most limiting factor. Unless you supplement with artificial light, you can't change that unless you move to a much lower latitude. So it may help to adjust your expectations by knowing when your plants really won't grow much, and when they will.

Available light for photosynthesis is a combination of light duration and intensity. The measurement is called the Daily Light Integral (DLI) and is expressed as moles per meter<sup>2</sup> per day.\* In general, plants grow very slowly or barely at all when DLI is 10 or less, which is generally the case in our latitude and climate from mid-November to mid-February. As we move into March, DLI can reach 20 or more. In June, average DLI in June is in the low 40s in the Northeast and upper Midwest. This link at <https://myutk.maps.arcgis.com/apps/MapSeries/index.html?appid=d91ba9eb487d-43f3a82161a1247853b6%20> brings you to a really interesting map of DLI for the US. Note that climate also influences DLI (e.g., cloudy precipitation days.)

These measurements reflect conditions directly under the sky. But greenhouse plastic, especially a double layer (which is really important for winter insulation) only lets through 65% to 70% of daylight. So that should lower your expectations even more (for big growth in the middle of the winter.)

For winter growing, the choice of the orientation of your tunnel is no contest: East-West. The long side should be facing south to receive the most sun. And taller crops should be planted in the north beds so they don't shade anything else out.

\*Intensity is measured in horticulture as # of photons hitting a unit area per time period. Photons are "light particles". One Mole of particles is 6 X 10<sup>23</sup> of them. (You may recall this number from high school chemistry as "Avogadro's Number." A mole of oxygen molecules is 6 X 10<sup>23</sup> oxygen molecules.)

## VEGETABLE PRODUCTION

**In second place: Temperature is limiting.** It's not a distant second place, either, because there will be no growth with temperatures consistently under freezing. Obviously, it's necessary to choose crops which are hardy enough to withstand subfreezing temperatures without damage. All of these crops can actually tolerate subfreezing temperatures through the following mechanisms:

- By concentrating sugars and other dissolved antifreeze-like compounds in cell sap, the freezing point is lowered.
- Water in cells also can move into the intercellular spaces where ice crystals can form without rupturing cell walls.
- Proteins are made in those cells that keep them from being harmed during this cell dehydration.
- The waxy cuticle layer also thickens, though the tunnel environment is often wind-less, so this plays a lesser role.

Mechanisms like these gradually kick in during the acclimation period known as "hardening-off." If you've planted into your tunnels in September, the gradual seasonal change will make this happen. But if plants grown in warm conditions are suddenly plunged into freezing conditions, they won't survive.

**We can modify temperature** by implementing practices that take advantage of the all-important Greenhouse Effect. First, consider what you get when you have **a clear plastic tent over damp soil in the winter.** If it's daytime and the sun is shining:

- You get warm air.
- If the heat can't easily escape, you get really warm air.
- You get a lot of humidity: water stored in the ground as liquid turns into water vapor that fills the air. The warmer the air is, the more water vapor can be held by the air. Also, the warmer it is, the more water is transpired out into the air by the plants—unless the air is fully saturated with water (100% R.H.) In that case, plants won't transpire. They also won't transpire if the soil is frozen.
- You get condensation on the inside of the plastic cover in the daytime when the moist air comes into contact with the cold surface of the cover. This interferes with light transmission.
- You get storage of heat: the soil and its moisture are a perfect heat sink (mass which can absorb energy.) So you get warm soil, at least within the top few inches of the surface. Energy is not conducted to a great depth, though, because the Earth is a massive mass. Which is a good thing.

On cloudy days, the air doesn't warm up much inside, and the relative humidity does not increase much, either. In fact, such a steady state is better for plant survival than big day/night fluctuations.

**Heat loss.** If it's nighttime and the sky is clear, heat energy stored in warm masses on the Earth's surface (such as a high tunnel) can freely radiate right through the plastic and out into space. (This is called radiational cooling.) This is usually the primary form of heat loss from a decently sealed-up high tunnel. Heat is also lost (in the form of "long wave radiation") through the plastic and hoops (conductive heat loss) and through gaps that allow warm air to directly escape (convective heat loss.)

On cloudy nights, the cloud layer of water vapor acts like a blanket, holding heat in at the Earth's surface. This keeps the night air from cooling down as much. And that, in turn, reduces the radiant heat loss from the high tunnel. The tunnel cover, itself, does not act like a blanket of clouds.

Inside the tunnel, the soil and other objects re-radiate heat during the night, and that heat passes through the tunnel cover (again, radiational cooling.) Also, the more above-ground mass stored inside the tunnel, the more absorption of heat during the day and

re-radiation at night. This is why some people put black barrels full of water inside their tunnels. Remember, though, that they should be along the north side so they don't cast shadows during the day.

**Row covering** adds another important layer of protection. This is essential for survival of most crops once the temperature gets down below 25°F, though some can survive down to the upper

*Continued on page 30*

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## VEGETABLE PRODUCTION

### Winter High Tunnel Environment: Limiting Factors to Growth continued from page 29

teens. There is no exact trigger temperature to apply row covers but to be safe, go with 35°F. Row covers work as miniature cloudy blankets over your crops: warm, moist air radiates from the soil and condenses on the inside of the cold fabric. It's essential that the covers are suspended over hoops so that the fabric is not in contact with the plants. Not only does this keep leaf surfaces from staying wet for long periods, it also prevents ice on the fabric from being in contact with foliage. If it is expected to get below 20 inside the high tunnel, a second cover may be necessary. It is very important to put on covers in such a way that makes it easy to remove them on sunny days. Also, cover edges should be fully on the ground to avoid convective heat loss. There are many innovative farmers who have developed assorted systems for this.

As long as you've chosen the right species, crops handle conditions pretty well, although extreme temperatures, low or high, could be injurious. Plants can freeze but they shouldn't be handled until they have thawed, or else they will suffer damage. Though harvest/washing/packing days are somewhat infrequent, monitoring of conditions and consequent chores to ensure plant health and safety are constant. Daily weather conditions will determine your management activities.

**Humidity control.** As mentioned before, hoops should be installed in preparation for the real cold. Make sure they are spaced closely enough to suspend fabric over the crops. The heavier-weight the cover you use, the more it will sag, especially when soaked with condensation, and the less light will penetrate. In months when the sun is higher (October, February, March), make sure that the temperature under the cover doesn't get above 75°F. Removal of covers would then be required by mid-morning, lest you accidentally cook your crop. Plants cool themselves by transpiring and if roots are sluggish from cold soil while the leaves are warm, it could be a disaster. Cover removal also allows the sun to heat the soil more, which, when covered back over late in the day, holds in heat for the cold night ahead.

Venting of the entire tunnel may also be required for reduction of both temperature and humidity. You don't want condensation on the high tunnel plastic during the day because it interferes with light. It can also keep the foliage wet, which leads to foliar disease. Avoid overwatering: it can lead to an excess buildup of humidity. Again, excess humidity results in wet leaf surfaces and more disease. Much of the soil moisture will hold pretty well through the darkest months when there's little growth, evaporation from the soil surface, or transpiration through the plants.

Cinch down your rollup sides for the winter by mid-October by tucking the end-edges of the rollups into wiggle-wire tracks (to avoid nighttime convective heat loss.) Do your venting from the end walls, either by opening the doors, or having louvre vents near the peaks. High vents are better, both for convective flow and to keep cold winds from blowing on your crops.

Depending on the date (check DLI), full sun may not be strong enough to raise the temperature by very much. In that case, you may choose to vent the tunnel but leave the covers on, or vice-versa. It may depend on whether or not it's a harvest day or how humid the air is. Lots of condensation is a reason to vent the whole tunnel.

Any venting or uncovering that you do has to be put back in place by mid to late afternoon. Hold in any heat you gained during

the day. If you can't always be there at the right times, play it safe, based on the weather forecast.

Make use of thermometers so you can accurately assess what's going on, both under the row covers and in the high tunnel

*Continued on page 37*

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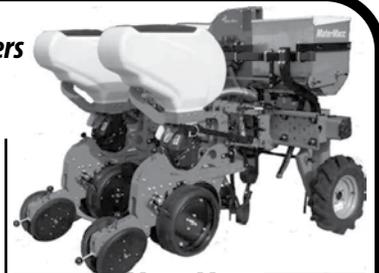
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## VEGETABLE PRODUCTION

# Developing Microbial Communities to Suppress Bacterial Diseases of Tomato

Kevin Hockett and Hanareia Ehai-Taumaunu



### Project Summary:

This project was initiated in the Summer 2019 with two primary objectives: 1) assess the effect of natural tomato microbial communities to suppress foliar diseases and 2) transfer microbial communities recovered from objective 1 to select those communities that provide the greatest disease suppression.

We are happy to report that by the conclusion of the usable season (before temperature and light conditions were no longer conducive for tomato growth in the Penn State greenhouses), we acquired encouraging results that it is indeed possible to develop a disease suppressive community following serial passage. We achieved ~60% reduction in disease severity and 10% reduction in disease incidence by the final passage compared to the peak severity and incidence when assessing natural infection alone, and a 20-30% reduction in disease severity and 10% reduction in disease incidence by the final passage compared to peak severity and incidence when assessing natural infection + supplemented pathogen.

As this project and its approaches are novel (we are not aware of any published reports using a similar strategy to develop a foliar disease suppressive community), it was expected that there would need to be an amount of trouble shooting to establish protocols and analyses appropriate for our objectives. We believe, however, that our results are promising and establish a strong foundation for continuation of this research program in the summer of 2020.

### Results:

**Objective 1** Assess the effect of natural tomato microbial communities to suppress foliar diseases.

Although we aimed to acquire several natural communities from commercial production settings, we were unable to do so. Thus, we were unable to directly address this objective in Summer 2019. We were able, however, to acquire two natural communities (though not from commercial production settings) that we utilized in objective 2.

**Objective 2** Transfer microbial communities recovered from objective 1 to select those communities that provide the greatest disease suppression.

Healthy plant material was collected from two sites in State College, PA. Two foliar samples were used to initiate this objective, one from a community (CG) and the other from a home garden (HG), which were collected in July and August, respectively. Plants were sprayed with either community, followed by inoculation of the pathogen *P. syringae* pv. *tomato* (Figure 1). At the end of each passage the microbial communities from three plants exhibiting the lowest disease severity were combined and transferred to a new set of ten healthy plants. The number of infected plants and the percentage of symptom coverage was recorded to measure disease incidence and severity, respectively.

*Continued on page 32*

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## VEGETABLE PRODUCTION

## Developing Microbial Communities to Suppress Bacterial Diseases of Tomato

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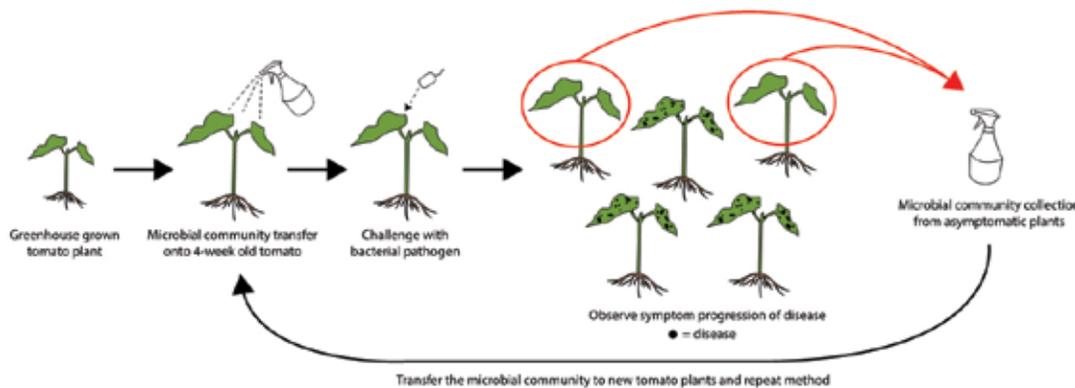


Figure 1. Diagram depicting the transfer of foliar microbial communities. Tomato leaves from either a home garden or community garden were used as the source for the starting microbial communities. These communities were sprayed onto 4-week tomato plants grown within a greenhouse setting. Two days after community application, plants were challenged with the bacterial speck pathogen. After an additional 5-7 days, which was sufficient for disease development, the top 3 plants that exhibited the lowest disease severity were used as community sources to initiate the next passage.

Because there was no way of separating selectively removing the speck pathogen from the community once it was introduced, the pathogen + buffer control (where new pathogen was introduced at every passage) cannot be directly compared to the HG and CG treatments. However, the pathogen + buffer control does act as a representative of the environmental conditions at the time, allowing us to control for environmental effects on disease severity and incidence.

The disease incidence (table 1) and severity (table 2) for the community transferred treatments (HG and CG) were much greater than either measure for the no-community control (pathogen + buffer). This is not unexpected for two reasons. First, the amount of pathogen added in the no-community control was consistent from passage to passage, whereas we expect that the amount of pathogen from HG and CG would have likely increased from passage to passage, as a result of pathogen build up from disease. Second, we think that potentially the pathogen coming from a leaf environment is more virulent than one coming from a laboratory culture environment. All communities reached 100% disease incidence by passage 5 and maintained that level of incidence until passage 8. For most communities, only 2-3 passages were required for all replicate plants to have some level of disease symptoms present. For either HG or CG + buffer, the pathogen was introduced in the first passage, but was not reintroduced in subsequent passages. This is different that HG or CG + pathogen, where the pathogen was introduced in the first passage, and was then reintroduced at the same level as the pathogen + buffer control.

Table 1. Disease incidence (number of plants infected out of 10 plants inoculated) for each community over multiple passages. Values are absent for Passage 1 and 2.

Passage	HG_Spray + Pathogen	HG_Spray + Buffer	CG_Spray + Pathogen	CG_Spray + Buffer	Pathogen + Buffer (Control)	No pathogen (Control)
P2	No data	No data	10	0	No data	0
P3	7	0	9	10	6	0
P4	10	4	10	10	4	0
P5	10	10	10	10	1	0
P6	10	10	10	10	3	0
P7	10	10	10	10	5	0
P8	9	9	9	9	7	0

Disease severity was recorded on a continuous scale (table 2). For HG, disease severity steadily increased from passage 3 to 7. In contrast, CG disease severity reached high percentages by

passages 3 or 4. The pathogen + buffer control remained under 10% disease severity for all passages.

Notably, there was a significant decrease in disease severity from passage 7 to 8 for all treatments except the control. At passage 8, the disease severity of the HG and CG spray communities with pathogen is reduced by 20-30%.

Table 2. Disease severity for each passage represented as percentages. Communities with more healthy plants will be more suppressive of disease. Values are absent for Passage 1 and 2.

Passage	HG_Spray + Pathogen	HG_Spray + Buffer	CG_Spray + Pathogen	CG_Spray + Buffer	Pathogen + Buffer (Control)	None (Control)
P2	No data	No data	15	0	No data	0
P3	5.6	0	30	15	7.2	0
P4	10	1.6	67.5	58	3.2	0
P5	27.6	22	51	47	1	0
P6	30	41.5	75.5	68.5	1.2	0
P7	42.2	65	60	57.5	7.5	0
P8	22.5	9	30	9	5.6	0

### Conclusions

Our results show that following serial passage of a pathogen within a community we were able to reduce disease severity significantly by the final passage. Additionally, we found similar, though more subtle, results with regard to disease incidence. We believe our results match with what is known regarding certain suppressive soils, where disease pressure builds over successive seasons of growing the same crop, followed by a sharp decline in disease.

To confirm our results, we will initiate another round of community passage in Summer 2020 and hope to expand our efforts to include the bacterial spot pathogen, *Xanthomonas perforans*.

Results from this project were used to secure additional funding from the Northeast Sustainable Agriculture Research and Extension (NE SARE) to continue this work. We also anticipate seeking additional, larger federal funding, which will rely on these preliminary findings.

We believe this proof-of-concept research supports the idea that community passage is a viable route to develop controls for bacterial diseases of tomato.

Dr. Hockett and Ms. Eshau-Taumaunu are with the Dept. of Plant Pathology and Environmental Microbiology at Penn State Univ. This research project was funded by PVGA and the Pennsylvania Vegetable Marketing and Research Program.

## VEGETABLE PRODUCTION

# High Tunnel Tomatoes: Fertility and Tissue Testing

Katie Campbell-Nelson and Becky Maden

As summer days grow longer and warmer, high tunnel tomatoes grow steadily upwards, requiring weekly pruning, trellising, and other maintenance. As the plants continue to grow and fruit begins to ripen, the nutrient demand for calcium and potassium required to produce high quality, marketable fruit increases.

Many growers focus on calcium (Ca) at this stage in order to avoid blossom end rot (BER) later in the season. However, BER is more an imbalance of Ca within tomato plants themselves rather than lack of Ca availability, and more often than not, it is related to soil moisture fluctuation, heat stress, and sometimes, excessive nitrogen. Potassium (K) deficiency, on the other hand, in concert with excessive heat, can be an even greater problem for quality fruit production, resulting in blotchy ripening, yellow shoulders, and grey wall. Indeterminate varieties in tunnels and greenhouses continuously carry heavy loads of fruit, so potassium demand remains high from early-summer onward.

Taking a high tunnel soil test in the early spring can help guide your soil amendment planning to sustain the heavy nutrient demands of high tunnel tomatoes. We recommend getting a field soil test AND a saturated media test for high tunnels; see more information below.

A survey of 20 high tunnels conducted in 2018 in Massachusetts, New Hampshire, Rhode Island, and Vermont showed that both potassium and nitrogen are removed in large quantities by high tunnel tomatoes. As a result of this study, fertility recommendations for high tunnel tomatoes are now more closely correlated with expected crop yield. In other words, high-producing hybrid, indeterminate plants, which are in the ground for 6+ months (and may be grafted) have significantly higher nutrient demands than a June-planted, determinate tomato. Intuitively, the more biomass your plant is expected to accumulate, the greater the nutrient demands. Specific yield-based nutrient recommendations can be found in the High Tunnel Tomato section of the latest edition of the New England Vegetable Management Guide at <https://nevegetable.org/crops/tomato-greenhouse-and-high-tunnel>.

A few other practices that may help improve yield at this point in the season include:

- Provide adequate soil moisture. Install at least 2 drip lines per plant, up to 4 in sandy soil. Mulches may help keep moisture even across the soil surface.
- Keep up with pruning. Prune side shoots when small. Remove foliage to first cluster.
- Track performance. Measure harvests, even if simply counting boxes. This is key to assessing management changes.
- Monitor available AND reserve soil nutrients. A field soil test extracts reserve nutrients and reports the nutrient levels that will theoretically become available to plants as the season progresses. In the warm, well-watered high tunnel environment, tomato plants will start growing quickly immediately, so it's important to know what nutrients are immediately available to those plants; this is measured using a saturated media extract (SME) test. Use both the field soil test and the SME to plan nutrient applications in the spring, and then take leaf samples monthly to inform fertigation or side-dressing during the season (more information on tissue testing is available below).
- Scout and manage pests. Do not let challenging insects (like aphids) or diseases (like powdery mildew) get ahead of you. Set up a regular scouting schedule and get in touch with us ([umassveg@umass.edu](mailto:umassveg@umass.edu)) for pest ID help. Scouting resources including a scouting form and tomato disease guide, are available at <https://ag.umass.edu/vegetable/resources-services/scouting-resources>.

Tissue testing is one way to understand what nutrients your plants are actually taking up from the soil before you see deficiency symptoms in your plant or even worse, on your fruit. Many tunnels need a mid-season boost of K through fertigation or top-dressing. Aiming for 3% K in the most recently matured leaves, by dry weight, is a good goal. University of Delaware Extension recommends the following optimum tissue test values, for most recently matured tomato leaves at first flower: N 2.8-4.0%, P 0.2-0.4%, K 2.5-4.0%, Ca 1.0-2.0%, Mg 0.25-0.5%, S 0.3-0.6%.

For conventional growers, soluble fertilizers with a K to N ratio of somewhere around 2:1 can help, according to research from Michigan. More N may be required for season-long production on indeterminate vines. For organic growers, you can top-dress sulfate of potash, as long as your irrigation moisture is able to reach it so it can dissolve, or, it can be dissolved in hot water for fertigation. How to take a tomato tissue sample: Tissue testing on a monthly basis, or even one or two times earlier in the season, can help take some of the guess work out of high tunnel growing and make sure that plants are taking up sufficient potassium, as well as other nutrients. At the very least, taking a sample at the on-set of fruit is a good time to ensure that nutrients are adjusted for a long and productive season. Here are the steps for taking an accurate tissue sample:

*Continued on page 35*

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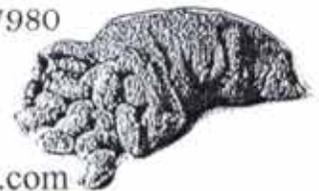
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**Mid-Atlantic Convention Program**

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- 3:00 **Practical Approaches to Correcting Irrigation Water pH and Bicarbonate Issues for Blueberries (tentative)** - Thomas Ford and Kathleen Demchak, Penn State Extension; Dr. David Bryla, USDA-ARS (tentative)
- 3:30 **Organic Materials for Soil Amendment and Mulching - The Good, The Bad, and The Ugly** - Dr. Bernadine Strik, Oregon State Univ.
- 4:00 **Good Fertilizer Nutrient Management in Blueberry - Tips for Proper Tissue Sampling and Fertilizer Do's and Don'ts** - Dr. Bernadine Strik, Oregon State Univ.

**1240 Stone Fruit -**

- 2:30 **\*\* Changes in Application Exclusion Zone for Orchard Pesticide Applications** - James Harvey, Penn State Univ.
- 3:00 **\*Integrated Weed Management in Peach Orchards** - Dr. Thierry Besancon, Rutgers Univ.
- 3:30 **Sweet Cherry Pruning & Training in Evolving Production Systems & the Physiological Basis** - Dr. Greg Lang, Michigan State Univ.
- 4:15 **\*Bacterial Diseases of Stone Fruit** - Dr. Kari Peter, Penn State Univ.

**Winter High Tunnel Environment: Limiting Factors to Growth**

*continued from page 30*

space, night and day. (Monitoring tools may be the subject of a whole 'nother article.) Keeping records of temperatures and your management tactics will help you to learn what works best under various conditions through the winter months.

**Sources:**

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*Mr. Radin is with the Univ. of Rhode Island Coop. Extension. From Vegetable Notes for Vegetable Farmers in Mass., Univ. of Mass. Extension, Vol 32, No. 27, November 19, 2020.*

## VEGETABLE PRODUCTION

### North American Strawberry Growers Meeting to be Virtual

The North American Strawberry Growers Association (NASGA) will be meeting virtually for three days January 18-20, 2021.

We will have three shortened days of presentations followed by a live Question and Answer period with our speakers. Each day will end with panel discussions and participants will be encouraged to actively participate to create a great networking opportunity. Break out rooms can be an option if there is enough interest.

The conference program will feature several speakers and include topics on strawberry production, pest management and marketing. Below is a list of speakers and topics they will be presenting. Titles may change as we confirm the final conference agenda

#### Monday January 18th

- 11:00am EST Grower Profile - Marc Van Gennip, Genson Plants, Netherlands
- 11:40am EST Cyclamen Mite Management - Justin Renkema, Agriculture Canada
- 12:00pm EST NASGA Annual Meeting
- 12:30pm EST Neopestalotiopsis: An Emerging Strawberry Disease - Natalia Peres, Univ. of Florida
- 1:00pm EST Insecticide Efficacy in Strawberries - Sarah Zukov, Strawberry Center, Cal Poly
- 1:30pm EST Panel Discussion – Strawberry Varieties – Kim Lewers USDA-ARS, Steve Knapp, Univ. of California, Courtney Weber, Cornell Univ., Beatrice Amyotte, Agriculture Canada

#### Tuesday January 19th

- 11:00 am EST Industry Outlook Post COVID 19 - David Magana - Rabobank
- 11:20 am EST Crown Size in Relation to Yield - Marc Bolda, Univ. of California
- 12:00 pm EST Optimizing Soil Nutrition – Noel Garcia – TPS Lab
- 12:30 pm EST Effectively Monitoring Plant Nutrients and Solutions to Meet Those Needs - Marc Bolda, Univ. of California
- 1:00 pm EST Panel Discussion – Managing Employees and Customers during COVID 19

#### Wednesday January 20th

- 11:00 am EST Food Trends in Light of COVID 19 - Sylvain Charlebois- Dalhousie Univ.
- 11:30 am EST Substrate Strawberry Production Basics - Eric Boot - BVB Substrates, Netherlands
- 12:00 pm EST Caliente Mustard as a Bio-fumigant - Joe Gies, Gies Farm, Moss Lake, WA
- 12:30 pm EST Robotics and Ultraviolet Light - the progress and future of non-chemical treatments - Adam Stager, TRIC Robotics
- 1:00 pm EST Panel Discussion- Scott Thompson - Sunflower Mania

Information on Registration can be found at [www.nasga.org](http://www.nasga.org).

### High Tunnel Tomatoes: Fertility and Tissue Testing continued from page 33

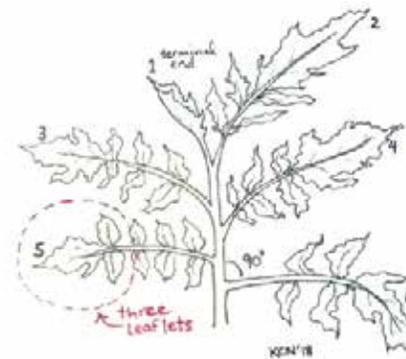


Diagram of how to find the most recently mature leaf on a tomato plant, and what part of the leaf to sample for tissue testing.

Illustration credit: K. Campbell-Nelson

When sampling tomato leaves, take 3 leaflets from the tips of 30 leaves.

- Take the most expanded leaf below the first blooming flower cluster, which often is about 5 leaves down from the terminal. The 6th leaf is usually at a 90° angle to the stem (picture).
- Sample in the hour before or after noon (this is usually the peak uptake of nutrients for the day)
- Collect a representative sample of the planting from at least 15 plants of a single variety
- If there is spray residue on the leaves, briefly rinse them with distilled water and pat dry
- When sending to a lab, pack in paper bags, not plastic, so the material does not begin to rot
- If you are trying to diagnose a nutrient deficiency on some of your plants, send samples of both “healthy looking” plants as well as afflicted ones.

#### Additional resources:

Univ. of Delaware Tomato Commodity Recommendations - <https://www.udel.edu/content/dam/udelImages/canr/photography/extension/sustainable-ag/NFP-2020-F-Tomatoes.pdf>

Refining Tomato Nutrition for Improved Packouts – Steve Bogaugh, PennState – <https://extension.psu.edu/refining-tomato-nutrition-for-improved-packouts>.

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*See page 3 for further details and page 34 for a membership form.*