PENNSYLVANIA
VEGETABLE GROWERS

NEWS

for the commercial vegetable, potato and berry grower

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Cover photos provided by Art King of Harvest Valley Farms

President's Message – Reflecting on the Past Year and Looking Ahead

Peter Flynn | President

Dear PVGA Members.

I hope this message finds you in good health and high spirits as we take a moment to reflect on the events of the past year within the Pennsylvania Vegetable Growers Association. It is with great honor and enthusiasm that I assume the position of PVGA President, succeeding Rita Resick. Rita played a pivotal role in guiding us through the challenges of the pandemic and the search of a new executive director. I extend my heartfelt thanks to Rita for her dedicated service to PVGA.

Continuing in the spirit of immense gratitude, we bid farewell to Bill Troxell, who, after an impressive 40-year tenure, retired as executive director of PVGA. The search for Bill's successor led us to the capable hands of the management firm Wanner Associates, based in Harrisburg. We are pleased to welcome Tammy K Linn as the new executive director. Wanner Associates began their engagement in September, allowing for a smooth four-month transition period, during which Bill generously contributed his expertise to ensure a seamless handover. We honored Bill with a PVGA Lifetime Membership Award and wish Bill and Cheryl much happiness in their next chapter.

Looking ahead, one of our primary goals for the coming year is to secure enough volunteers well in advance to run the PVGA food booth at the PA Farm Show. The booth is instrumental in our fundraising efforts, contributing close to $70,000 for vegetable research initiatives. Volunteering at the Farm Show booth is a unique experience, providing an opportunity to connect with farmers from across the state, indulge in batter-dipped vegetables, and gain insights into various agricultural operations. I encourage all PVGA members to consider volunteering for a shift or two at the Farm Show, as it allows us to collectively uphold our commitment to supporting research initiatives – a tradition integral to Bill Troxell's tenure. Stay tuned for more information.

Your support is crucial to the success of PVGA, and together, we look forward to navigating the future of our association. I appreciate your dedication and am excited about the opportunities that lie ahead.

Inside this Issue

Pennsylvania Vegetable Growers News *is the official publication of the Pennsylvania Vegetable Growers Association*

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Our Mission:

PVGA serves Pennsylvania's commercial vegetable, potato and berry growers through education, research, advocacy and promotion.

Our Vision:

PVGA is 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 PVGA at the above address.

Flynn Elected PVGA President

PVGA Board of Directors (front row left to right) First Vice President Tina Forry, Secretary-Treasurer Bill Reynolds, Joel Weaver, Jon Strite, Amy Metrick, Morgan Bond, and Boots Heatherington; (back row) Executive Director Tammy K Linn, President Pete Flynn, Art King, Mark Troyer, Alan Kemmerer, and Rob Shenot

Peter Flynn was elected PVGA President by the Board of Directors on January 31 following the Annual Meeting. Second Vice Tina Forry replaces Flynn as First Vice President and Chris Harner was elected the new Second Vice President. Former President Rita Resick assumed the office of Past President and will remain on the Executive Committee with the other officers. Bill Reynolds was re-elected as Secretary-Treasurer. The officers are elected to one-year terms by the Board of Directors. The President and Vice Presidents traditionally are elected to their positions for two one-year terms before moving up to the next highest office so that the person elected as Second Vice President begins an eight-year cycle of serving in the four executive offices.

During the annual membership meeting, Past President Art King announced that he, Morgan Bond, Brian Campbell, Peter Flynn, Amy Metrick have been elected to three-year terms on the Board of Directors by the members of the Association. The Board elected Mark Troyer to a three-year term on the Board. Following are brief biographies of the newly re-elected Directors:

Morgan Bond

Morgan Bond works at B&R Farms in Ringtown (Schuylkill) with her husband, Kevin Bond, and her parents, Boots and Robin Hetherington. Morgan graduated with honors in 2014 with a bachelor's degree in Food Science from Penn State University. She works full-time as the Research & Development Associate Manager at Mrs. T's Pierogies and farms the nights and weekends in between. Morgan is the 7th generation in her family to actively continue the farm operation. B&R Farms is known for their pick-your-own strawberry patch, where they grow 5 acres of June-bearing matted row strawberries. Morgan helps to plant new acreage, monitor frost irrigation, coordinate the weeding and picking crews, deliver wholesale product, and manages the farm's social media presence. Aside from strawberries, Morgan helps Robin to manage and staff their spring greenhouse (annuals, hanging baskets, vegetables). She also supports Boots and Kevin with managing and maintaining the family's additional 400 acres - corn/soybean rotations, 40 acres of permanent hay, cover cropping rye, and a 1/4 acre of perennial asparagus. Morgan and Kevin participate in the PVGA Berry Growers meetings, with plans to expand their PYO business to include raspberries and blueberries by 2025. Morgan has volunteered at the Farm Show Food Booth for many years, missing a few recent shows to start a family. Morgan and Kevin were honored to receive the PVGA Young Grower Award in 2023. Morgan has been a volunteer for PVGA through her parents since 2003 and has been a member since 2017.

Brian Campbell

Brian is a fresh market grower in Berwick, Columbia County, who was first elected to the Board in 2007. He specializes in sweet corn, pumpkins, broccoli, lettuce, and other crops which he ships in wholesale quantities. He also operates a roadside farm market which he started when he was 14 years old. A 1990 graduate of Penn State University, he and his wife have two daughters and a son. Brian served as President of the Association 2020-2021 and 2012-2013 and has helped spearhead the Farm Show Food Booth management for many years. He has been a Director since 2007 and has one more year of eligibility.

Peter Flynn

Pete began dairy farming on the Jones's farm, now the current site of the Bayard Rustin High School, in 1986. In 1989 he planted sweet corn on one-eighth of an acre and sold his harvest from the back of his pick-up truck. Deciding to concentrate solely on growing produce, he sold his cows in 1992 and opened his first stand. In 2000, Pete moved his operation to Westtown School. Built on 170 acres of the school's land, the large farm stands on the north side of Street Road/Route 926 and grows some of the finest produce in the area. Pete, an active board member of the Chester County Food Bank, designates roughly 5 acres of land to grow for the less fortunate members of our community. In 2014, that 5 acres yielded approximately 120,000 lb. of fresh produce for the Chester County Food Bank. Customers and local chefs from all over the region travel for miles to purchase Pete's produce. Pete is currently First Vice President of the Association and has been a Director since 2018.

Arthur King

Art operates Harvest Valley Farms with his son David and his brother Larry in Valencia, PA, just north of Pittsburgh. Their marketing is just as diversified as their product list. Over 58 varieties of small fruits and vegetables are grown on 160 acres. They have a 530 member CSA, sell at three farmers markets, a home farm market, one wholesale account and host pick-your-own pumpkin activities in October. Art holds a BA Degree in Nature Conservation from California University of Pennsylvania and an associate degree in Business Management from Butler Community College. He is Past President of the Association and has served four terms on the Board. He also serves on the Capacity Development Committee. Art served as President of the Association 2010 – 2011 and was a Director from 2004 -2013 and from 2018 to present.

Amy Metrick

Amy Metrick is part of Metrick's Harvest View Farm and Market along with her parents Ken and Cathy Metrick and sister Laura in Butler County. They farm 50 acres of vegetables and apples that they sell at their retail farm market on the farm. Their family also runs a greenhouse in the spring, a CSA from June through November and a cider press from September through December. She graduated from Pennsylvania College of Technology with an associate degree in ornamental horticulture plant production and a bachelors in business management in 2014. She currently works for Penn State Extension as the Butler County 4-H Educator, is a member of the Butler County Farm Bureau, Butler Farm Show, and Mt. Chestnut Presbyterian Church. She has served two terms on the Board of Directors.

Mark Troyer

Mark owns and operates Troyer Growers in Waterford, Erie County, consisting of 1,600 acres of grains and 400 acres of potatoes for processing and chips. He is a board member and past president of the Erie County Farm Bureau as well as chairman of the Pennsylvania Potato Research Board. Mark has been a Director since 2015.

Newly Elected PVGA President presents Past President Rita Resick with a plaque of appreciation for her two years of service as PVGA President.

Life Memberships Awarded

The Board periodically recognizes individuals who have an outstanding record of service and dedication to the Association with a Life Membership in the Association. Steve Sample and Bill Troxell were awarded Life Memberships during the 2024 Mid-Atlantic Fruit and Vegetable Convention.

Steve Sample grew up in Marysville, Pennsylvania, along the Susquehanna River. He had a newspaper route and enjoyed free time gardening, fishing and hunting. After graduation from Susquenita High School in 1966, he attended Penn State Mont Alto Forestry school and received an Associate Degree in Forest Technology. During the summer, he worked for the Pennsylvania Railroad. In 1969 he was drafted into the United States Army and served 15 months in Viet Nam. After his honorable discharge, he attended HACC Community College and Penn State Capitol Campus under the GI Bill and received a Bachelor's Degree in Business Administration from Penn State in 1975. He also rehired with the Penn Central Railroad in 1973 and juggled a full-time job with a full college load.

He became interested in farming and started taking correspondence courses from Penn State. This was during the time when farmland development was increasing. He felt that local produce would be in demand in the future and in 1977 purchased a 37-acre farm in Duncannon, Pennsylvania. In 1978 he and his wife started farming with no equipment or experience. In 1980 they built a roadside market which is still used today. There were a lot of lessons learned the hard way. He joined the Pennsylvania Vegetable Growers Association, and by regularly attending the convention, going to Field Days and talking to other growers at volunteer events like the Farm Show food court booth, it allowed him to become proficient in growing vegetables and small fruit.

He continued to work full time with the freight railroad Conrail and with Amtrak. He juggled the farm duties and full-time employment by relying on family and hiring from local families. Railroad employment also allowed erratic shifts which gave him time to run the farm. Amtrak's customer service and safety training were valuable skills which he used on the farm. The farm currently sells sweet corn, cantaloupes, tomatoes, peppers, seedless watermelons, strawberries and blueberries at their self¬service roadside stand. At its peak it also had an acre of peaches, a bedding plant operation and wholesale sales to a local supermarket, After retirement from his full time job in 2011, he constructed a sugar house with an evaporator and makes maple syrup for friends and family. Although the vegetable acreage is smaller than at its peak, he still searches out the latest varieties, techniques and equipment. He's not slowing down on the farm.

He faithfully participates in monthly Berry Growers Exchange virtual meeting PVGA sponsors and serves on the PVGA Convention Planning Task Force. But the real reason for honoring this longtime PVGA member with a Life Membership is the days and hours he has spent over the years helping to set-up and tear-down the PVGA Farm Show Booth. Despite at times painful knee joints, he spent three to five days each year helping with set-up and tear-down as well as volunteering several days during the Farm Show. His willingness to help, his ability to take responsibility for completing a task and his mechanical/carpentry skills have been invaluable. PVGA is pleased to honor Steve Sample with a Life Membership in the Association.

Bill Troxell, a native of Northumberland, didn't grow up as a farm boy, but developed an interest in vegetable growing when he was a 4-H member and while working on several neighboring vegetable farms during high school. Those experiences led him to pursue his degree in horticulture from Delaware Valley University. He also worked summers at Whitenight's produce farm in Danville during college.

Troxell went on to study at Penn State, where he worked with field plot lime and fertilizer research on vegetables and laboratory analysis of plant tissue, while pursuing a Master of Science in horticulture. After receiving his degree in 1982, he stayed on an additional year to continue his research work, then returned to work at Whitenight's Farm Market.

The six years he spent at Whitenight's — a fresh-market wholesale and retail vegetable crop operation — provided valuable real-world experience. Responsibilities for greenhouse production of bedding plants, hanging baskets and potted plants, seeding, watering and labor supervision, along with insect, pest and disease control gave Troxell a well-rounded background.

In December 1983, Bill formed Troxell Administrative Services to provide his expertise to horticultural organizations, with PVGA his first client. In 1989, Bill also took on duties with the Pennsylvania Vegetable Marketing and Research Program (PVMRP).

While overseeing the PVGA, Troxell's main duties involved providing educational resources to organization members. That membership, which stood at 274 in 1983, had grown to just over 1,000 in recent years. Following a pandemic-related decline, the number of members is rebounding. One of the important means of providing members with the latest industry information is PVGA's newsletter, which was founded and produced by Troxell. He also provided weekly email updates to the organization's members.

Coordinating the annual Mid-Atlantic Fruit and Vegetable Growers Convention's registration, vegetable educational sessions, and publicity was another key role for Troxell. Troxell worked along with Penn State experts to help arrange these educational programs.

In 2008, the PVGA's Pennsylvania Farm Show food booth began. The stand is perhaps best known for its blooming onions and other batter-dipped fried veggies. It started with just offering vegetable soup. Now it showcases lots of other vegetables and fruits with an expanding range of offerings designed to appeal to the public's palates. Corn nuggets, pumpkin funnel cake, berry-battered Oreos and strawberry surprise slushies have all been on the menu. The Farm Show food booth — which relies on volunteers from its membership — is not only a public relations plus for marketing vegetables and fruits, but also serves as an important source of revenue for PVGA.

As Troxell exits his roles with the PVGA and PVMRP and looks forward to more time for traveling and doing mission work, he concluded, "The Lord had me in the right place at the right time, working for the president of the PVGA, when they needed an executive" back in 1983. Troxell is also glad to have worked beside his wife, Cheryl, who assisted him with clerical and other duties.

PVGA Members Adopt Policy Resolutions at Annual Meeting

Members approved a series of Policy Resolutions at the Association's Annual Meeting on January 31 at the Hershey Lodge during the Mid-Atlantic Fruit and Vegetable Convention. These Policy Resolutions determine the Association's official position on various current issues. The following changes to the Resolutions were adopted:

Proposed Policy Resolutions
(Underlined text is to be added. Strikethrough text is to be deleted)

The Association is on record as:

State Resolutions

1. Supporting increased efforts by the issuing agencies to provide recipients of Senior and Women-Infants-Children Farmers Market Nutrition Program vouchers with additional information on where to use the vouchers and to encourage recipients to use the vouchers earlier in the season.
2. Opposing requirements for permanent sewer systems for temporary housing for agricultural workers.
3. Opposing state mandated over-time pay for agricultural workers.
4. Supporting the development by PennDOT of an intermediate driver's license for immigrant workers with proper documentation (e.g. tax identification or social security number, proof of employment or legal residency) with an annual review. However, this will not qualify to the workers to be registered to vote under the motor/voter act until the immigrant becomes a U.S. citizen."
5. Supporting the elimination of the Adverse Effect Wage Rate for H-2A employees as currently calculated and replacing it with a minimum wage rate that is 110% of the federal minimum wage.
6. Supporting the expansion of the definition of "farm use" to include produce deliveries from farm to market for farm tag availability.
7. Supporting the ability of farm operators to contract or delegate licensed hunters to harvest wildlife for crop damage without opening it to the public.
8. Opposing the reallocation by the General Assembly of funds from the Game Fund to any other agency so as to jeopardize the Game Commission's eligibility for federal Pittman Robertson funding.
9. Supporting an antlerless only, shotgun only season before the archery season in special regulations areas.
10. Supporting the opening of the regular rifle whitetail season one week earlier.
11. ~~Opposing hunting on Sundays with the exception of hunting crow; coyote and fox, as well as woodchuck in cultivated fields with express written permission of the landowner (2005 and 2017);~~
12. ~~Supporting the following requirements/restrictions if Sunday hunting expansion were to become law: (2019)~~
    - ~~a. Trespass laws be amended to address Pennsylvania Farm Bureau "trespass policy";~~
    - ~~b. Hunting be allowed only with written private landowner permission;~~
    - ~~c. Hunting for deer be allowed "on state game lands and state forests with "No Sunday Hunting" signage provided at no charge for adjacent private lands at the owner's request;~~
    - ~~d. Hunting be expanded to include antlerless deer and woodchuck only on Sundays;~~
    - ~~e. Sunday hunting for antlerless deer be limited to:~~
        - ~~i. 1st Sunday of archery,~~
        - ~~ii. 1st Sunday of flintlock,~~
        - ~~iii. Friday, Saturday, and Sunday after the Thanksgiving holiday~~

PVGA Annual Legislative Day Recap

Jake Newman | Wanner Associates Intern

PVGA held its Legislative Day on March 19, 2024. Members arrived at the Pennsylvania Capitol to visit with several senators and representatives to relay PVGA's legislative priorities for the upcoming year.

The morning started off in meetings with Representatives David Zimmerman and Barb Gleim, both members of the Agriculture Committee. They expressed continued support for PVGA and emphasized the importance of agriculture in the state. PVGA President Peter Flynn and board member Art King spoke about added burden of unemployment compensation payments for H-2A workers that are never eligible to receive compensation

Following the meeting with Zimmerman and Gleim, members met with the Chair of the House Agriculture and Rural Affairs Committee Eddie Pashinski. Pashinski is well positioned as chair of the committee to hear PVGA's concerns and bring forth legislation. Board member Bill Reynolds emphasized the inconsistencies between the IRS and Pa Dept of Revenue's interpretation of the 179-tax depreciation law and Pashinski was very disappointed to hear of the inconsistencies and vowed to continue looking into solutions in conjunction with PVGA. An important line of communication was opened with Pashinski to exchange information and keep an open discussion. His awareness of our main priorities marked an important step forward in cultivating good working relationships with legislators. PVGA First Vice President Tina Forry and board member Art King outlined the importance of continued funding for the Penn State Agricultural Extension. She discussed the hiring problems occurring and the anxiety that lack of certainty about guidance from Penn State causes.

Next, PVGA members split up to tackle the Senate. Members met with Senator Judith Schwenk, Elder Vogel, and Appropriations Chair Scott Martin. Martin, a lifelong resident of Lancaster county, appeared eager to listen. Board member Boots Hetherington kicked off the meeting by discussing the importance of PVGA to the state's agricultural business and why the issues the Association is facing need to be addressed. Martin plays a crucial role in determining the state's budget, as a result he is a well-connected senator making him an important connection for PVGA. Martin was especially receptive to expanding broadband internet access. He mentioned that as a result of the federal infrastructure law passed by Congress, Pennsylvania would be receiving an influx of funding to support broadband.

PVGA's Legislative Day proved to be an impactful and productive event. Members were able to engage with key legislators, who reiterated their steadfast support for PVGA and the agricultural sector in the state. The discussion with Chair Eddie Pashinski of the House Agriculture and Rural Affairs Committee showcased a promising commitment to addressing pressing issues such as unemployment compensation and agricultural extension funding. Senator Scott Martin's reception of PVGA's concerns highlights a vital partnership in advocating for the interests of Pennsylvania's agricultural community. The interactions underscore the importance of ongoing dialogue between PVGA and elected officials. Doing so lays a solid foundation for future advocacy efforts and positive legislative outcomes.

Distinguished Service Awards Presented Posthumously

PVGA's Board of Directors honored Sinclair Adams and Thomas Ford posthumously with Distinguished Service Awards. The two Penn State Extension educators worked faithfully with growers and PVGA over the years.

Sinclair Adams who passed away in April 2023. was the husband of Kirsten M. Davidson Adam. Born in 1955 in Hartford, Connecticut, Sinclair grew up in West Chester, Pennsylvania, and graduated from the University of Wyoming and then received his Master's Degree in Plant and Soil Science from the University of Vermont, where he met Kirsten.

Sinclair began his career in horticulture at Waterloo Gardens in Exton, PA. He worked for the Brandywine Conservancy, and then Greenleaf Nurseries until 1989. That year he established Dunvegan Nursery, which he co-owned with Kirsten for 23 years. He was an Adjunct Professor at Temple University for 5 years. He loved to mentor the many students who passed through his door. He worked as a Floricultural Extension Educator at Penn State for 9 years, as a Master Gardener Coordinator, and as Director of the PSU Flower Trials in Landisville. Sinclair enjoyed gardening, sailing, exploring nature, reading, and was a lover of history. He is survived by wife and daughter, Erika Leigh Adam.

The Penn State Flower Trials at Landisville are a long-established and well-known showcase of new flower varieties that allow flower/greenhouse growers to see firsthand the performance of these varieties. And it takes hard work to plan, plant and maintain those trials AND then evaluate the varieties for growers and report those results to growers. Sinclair had an important role in maintaining the legacy of the Penn State Flower Trials and they are part of his legacy. Besides his work the Flower Trials and with greenhouse growers in the southeastern part of the state, for many years, PVGA was privileged to have Sinclair's assistance in planning the Greenhouse Ornamental sessions at the Mid-Atlantic Convention.

Thomas Ford, who passed away in December 2023, was born in Washington D.C., and married Laura Levering in 1986 in Westminster, MD. Tom graduated from South Carroll High School in 1978, then earned a BS in Horticulture from the Univ. of Maryland and earned a MBA in Business Administration from Frostburg State University. Tom was a Commercial Horticulture Educator for 41 years, most recently at Penn State Univ. for the last 31 years.

Before falling ill, he was a member of St. Patrick Church in Newry. Tom enjoyed taking trips with his wife and spending time with his family. Tom was very involved in planning the educational program for the Mid-Atlantic Fruit and Vegetable Convention for many years, organizing workshops and various sessions. He also wrote numerous articles that appeared in the PVGA newsletter and worked closely with the growers in the south-central part of the state.

Tom was an outstanding Extension Educator and will be solely missed by growers and the Association. His wife Laura and four sons: Sean of Ebensburg, Zachary of Hollidaysburg, Andrew and girlfriend, Gracynn of Duncansville, Kevin of Hershey and grandson, Arlo received the Tom's award during the Annual Growers Banquet during the convention.

Young Grower Award

PVGA presented its Young Grower Award to Andrew and Kim Gadomski of Kim and Andrew's Farm Market.

Andrew started his market selling pumpkins on a wagon in 2016. He only grew pumpkins and some gourds but also sold some honey and maple syrup that he produced.

In 2017, Andrew built a table with an umbrella for his sales but later in the season built a shed from scrap lumber from around the farm. He grew about five acres of vegetables including cabbage, tomatoes, sweet corn, summer squash and pumpkins. The next year he added a few crops and expanded production to 15 acres of produce which he marketed from a tent while he constructed a small free-standing building. He also set up a 16 ft. by 48 ft. high tunnel. In 2019 he added a 30 ft. by 80 ft. high tunnel.

A permanent building for the operation was constructed in 2021 as they kept expanding to accommodate their growing business. Their vegetable acreage increased to 30 acres. Kim and Andrew were married in 2022 and adopted a fur baby from the animal shelter. In 2023, the couple grew about 40 acres of vegetables plus about 210 acres of hay besides adding 30 ft. by 120 ft. high tunnel. They put in about 2,000 taps for the maple syrup season and maintain 15 hives of honeybees.

On the home front, they adopted another fur baby and on October 3 welcomed the fifth generation of the farm family to the world with the birth of their daughter Sophie.

Former PVGA Executive Director Honored

On Sunday, January 28, friends and family gathered to honor William Troxell at the Hershey Lodge.

Troxell, who retired on December 15, 2023 was recognized for his 40 years of dedication to Pennsylvania growers. In addition to friends and family, PA Department of Agriculture Secretary Russel Redding joined the celebration which was held at the Hershey Lodge.

PVGA's Board of Directors extends their gratitude to Bill for his commitment to PVGA, and their best wishes to Bill and his wife Cheryl for a relaxing and enjoyable retirement!

PVGA's Farm Show Booth

Bill Reynolds | PVGA Secretary/Treasurer on behalf of the Farm Show Booth Task Force

We want to thank everyone who volunteered at the Farm Show to make it another successful year. Without dedicated volunteers returning year after year, as well as the new volunteers, we would not have been able to make the generous donations to fund all the vegetable and small fruit research.

This year was our second best year for raising funds, behind 2023 which had near perfect weather and people eager to enjoy getting out and about again. All of the research projects which were requested this year were fully funded due the partnership between PVMRP and PVGA. Over the years we have been able to raise 1.9 M+ for vegetable and small fruit research during the Farm Show due to the dedication and commitment of our volunteers.

For 2025, we are trying a different way of cutting some of the vegetables and peeling onions. Members of our Plain Sect community have offered to prep some of the vegetables off site at their packing facilities. This will help alleviate the need for the countless volunteers to prep the veggies onsite. Some vegetables will still be prepped on site, such as the zucchini, as they do not hold up well cut in advance.

Also in 2025, our booth will have a better design to accommodate more frying capacity for the fried pickles and corn dogs, as well as more room for our front line volunteers to help.

We will also begin working to sign up volunteers earlier and hope to have all positions filled prior to Thanksgiving. We hope you will start thinking about when you can help.

See you in January for the 2025 Farm Show!

Making Memories at the Farm Show

Art King | PVGA Board Member

Working at the Farm Show every year is something that me and the grandkids really look forward to. I take as many as I can pull away from their other activities. I tried to get five to come with me this year but it ended up with just Anna and Malaya. We left at 6 am Saturday to get there by 9:30 to avoid most of the intense traffic. Our work schedule was 3 to 9 Saturday so we had plenty of time to peruse to entire Farm Show. Of course, I had to buy them new Farm Show shirts and fancy hats. On Sunday we got up early and went to church at St. Patrick's Cathedral by the capital. We are always amazed at the architecture of that church. Then we were back at the Farm Show for our 9 to 3 shift. Everybody at the vegetable grower's booth is so nice, especially the Michaels family. The girls enjoyed working with them. Our trip home was easy because the girls were so excited about the whole experience, we joked and laughed to whole time.

Crop Diagnostics: What's Wrong with This Crop?

M. D. Orzolek | Department of Horticulture The Pennsylvania State University

Diagnosing foliar/fruit disease symptoms or abnormal growth of vegetable crops in respect to vegetative or reproductive growth can be very difficult and exasperating. Growers have blamed their problems on nutrition, insect, or disease problems that are generally common to all field production systems. Unfortunately, it is very difficult for the field vegetable growers to detect early injury symptoms on most vegetables before calling for professional help. There are specific symptoms growers should be looking for with most vegetable production problems.

Water contamination can occur if there is a shallow well, large above ground pond, and/or unusually heavy rains following application of chemicals (water soluble formulations) in the field. Unfortunately plants tend to be more sensitive to chemical contaminants than humans and injury to plants can occur at part per billion (ppb) levels as well as part per million (ppm) levels, especially in young plans that have been recently transplanted in the field. Atrazine and other water soluble herbicides have been positively identified as water contaminants in the last 5 years. Injury symptoms range from marginal yellowing or browning of the leaves of plants to abnormal plant growth and total death of the plant. Several herbicides that are found in water as contaminants can cause developing tomato fruit to have differential growth rates of the locular tissue in the fruit resulting in catfaced tomatoes. Current and potential growers are encouraged to have their water source tested for any contaminants prior to placement of vegetable transplants in the field.

Diagnosing the Problem

It is important to make the correct diagnosis of the plant problem since lack or delay in treatment may cause a delay in crop maturity and/or crop loss. Visual symptoms on the plants may be difficult to separate from nutrition or disease problems; therefore, try to eliminate both nutrition and disease problems before pursuing the water contamination route. Nutritional disorders generally can be found as a distinct pattern in the field, affecting the entire row of plants or the entire field. In addition, usually specific parts of the plant are affected for example; leaves - terminal, mid section or lower leaves, and/or fruit. Both soil and tissue testing should be considered to verify suspicion of a nutrient disorder. A disease problem can have a more general infection pattern throughout the entire field or random without any pattern in the crop. Since fungi, bacteria, and viruses can infect almost all vegetables crops, correct identification of the problem is very critical in containing additional spread of the disease organism in the field as well as total eradication of the problem. In addition, there have been several incidences where nematodes have caused economic damage to the field grown vegetable crop. Damage from nematode infestation can occur in all soil types, but more prevalent in the coarser type soils.

Keys to solving potential plant problems in field vegetable production

1. Determine whether there is a pattern to the symptoms.
   a. Does the pattern correlate with a certain area in the field, such as a low spot, poor-drainage area, or sheltered area? Does the pattern correlate with concurrent field operations, such as time of planting, method of fertilization, and rate of fertilization?
2. Try to trace the history of the problem.
   a. On what date were the symptoms first noticed?
   b. What fertilizer and liming practices have been used?
   c. What pest-management practices have been used to suppress or control diseases and undesirable insects and weeds--what chemicals (if any), when applied, and what application rates?
   d. What were the temperatures, moisture conditions, and level of sunlight?
   e. What was the source of seed or transplants?
   f. Which crops were grown in thje same area during the past 3 to 4 years?
3. Examine the affected plants to determine whether the problem is related to insects, diseases, or cultural practices.
   a. Do the symptoms point to **insect** problems? (A hand lens is usually essential to determine this.)
   (1) Look for the presence of insects, webbing, and frass on foliage, stems, and roots.
   (2) Look for feeding signs such as chewing, sucking, or boring injuries.
   b. Do the symptoms suggest **disease** problems? These symptoms are usually not uniform; rather, they are specific for certain crops.
   (1) Look for necrotic (dead) areas on the roots, stems, leaves, flowers, and fruit.
   (2) Look for discoloration of the vascular tissue (plant veins).
   (3) Look for fungal or bacterial growth.
   (4) Look for virus patterns; often these are similar to injury from 2,4-D or other hormones and nutritional problems.
   (5) Examine roots for twisting or galling.
   c. Do the symptoms point to **cultural** problems? Look for the following:
   (1) Nutrient deficiencies. A soil test from good areas and poor areas should taken as well as tissue samples of affected plants.
      - Nitrogen--light green or yellow foliage. Nitrogen deficiencies are more acute on lower leaves.
      - Phosphorus--purple coloration of leaves; plants are stunted.
      - Potassium--brown leaf margins and leaf curling
      - Magnesium--interveinal chlorosis (yellowing between veins of lower leaves).
      - Boron--development of lateral growth; hollow, brownish stems; cracked petioles.
      - Iron--light green or yellow foliage occurs first and is more acute on young leaves.
      - Molybdenum--whiptail leaf symptoms on cauliflower and other crops in the cabbage family.

   (2) Nutrient toxicities.
   a. - Toxicity of minor elements--boron, zinc, manganese.
      - Soluble salt injury--wilting of the plant when wet; death, usually from excessive fertilizer application or salts in the irrigation water.

   (3) Soil problems. (Take soil tests of good and poor areas.)
      - Poor drainage.
      - Poor soil structure, compaction, etc.
      - Hard pans or plow pans

   (4) Pesticide injury. (Usually uniform in the area or shows definite patterns, and more than one plant species, such as weeds, often are symptomatic.)
      - Insecticide burning or stunting.
      - Weed-killer (herbicide) burning or abnormal growth.

   (5) Climatic damage.
      - High-temperature injury.
      - Low-temperature (chilling) injury.
      - Lack of water.
      - Excessive moisture (lack of soil oxygen).
      - Frost or freeze damage.

   (6) Physiological damage.
      - Genetic mutations.
      - Air-pollution injury.

Some pollutants that affect vegetable crops are sulfur dioxide (SO_2), ozone (O_3), peroxyacetyl nitrate (PAN),and chlorine (Cl).

Sulfur dioxide causes acute and chronic plant injury. Acute injury is characterized by clearly marked dead tissue between the veins or on leaf margins. Chronic injury is marked by brownish red, turgid or bleached white areas on the leaf blade. Sensitive crops – squash, pumpkin, mustard, spinach, lettuce, endive, Swiss chard, broccoli, bean, carrot and tomato.

Ozone symptoms in plants are small stipple-like or flecklike lesions visible only on the upper leave surface. These very small, irregularly shaped spots may be dark brown to black or light tan to white. Some older watermelons varieties, red varieties of Irish potatoes and beans are particularly sensitive to ozone.

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Allium Leafminer Active

Tim Elkner | Penn State Cooperative Extension | Lancaster County

Allium leafminer (ALM) is active in Lancaster County now and I expect the main period of spring emerge to start this weekend based on forecast temperatures. ALM attacks plants in the Allium genus including onion, garlic, leek, scallions, shallots, and chives and overwinters in the soil. Upon emerging in the spring adult females puncture leaves with their ovipositor and both males and females feed on leaf sap. This leaf damage appears as a characteristic linear series of round wounds which are most easily seen on onions. Egg-laying begins about one week after the flies become active.

Growers should scout fields now to see if this pest is active in any allium plantings on your farm. I expect the main spring emergence has already started in warmer parts of the state in the southeast and along the Maryland border. Row covers need to be in place if that is your preferred method of crop protection. If you plan to use insecticides for management, the first application should be made about two weeks after the first leaf damage is seen. Systemic insecticides – with an added surfactant - tend to work best because the larvae are mining inside the leaf tissue. Since Allium leaves are very waxy, a surfactant is recommended whenever applying insecticides to allium crops. A list of recommended insecticides can be found in the 2024/2025 Mid-Atlantic Commercial Vegetable Production Guide. Be sure to read and follow all label directions whenever applying insecticides to your crops, especially the pre-harvest intervals (PHI).

When scouting for ALM, finding adults is easiest in the cool temperatures of early morning and by looking at the tops of the leaves. The flies are about 1/4" long and look like a small housefly except for their orange-yellow head coloration. Generally, finding the feeding scars on leaves is easier than finding adults, especially when scouting during windy conditions. Growers can use the 1-800-PENN-IPM (736-6476) phone hotline to listen to the messages recorded regarding activity of ALM in the spring and during the second flight in the fall. You need a touchtone phone to select and listen to these prerecorded messages. After dialing in you select "1" for vegetables and then "2" for onion and alliums. The messages are updated weekly during spring and fall when ALM are active based on scouting a sentinel plot at the PSU research farm in Manheim as well as scouting in some commercial grower fields. These messages will help you determine when you need to start and stop protecting your allium crops from ALM.

Onion leaf showing typical linear patter of leaf damage from allium leaf miner. Photo by Tim Elkner

Allium leaf miner flies showing characteristic orange-yellow head coloration. Photo by Tim Elkner

Crop Diagnostics: What's Wrong with This Crop?—*continued from page 10*

PAN affects the underleaf surface of newly matured leaves, and it causes bronzing, glazing, or silvering on the lower surface of sensate plants. Sensitive crops are Swiss chard, lettuce, beet, escarole, mustard, dill, pepper, potato, spinach, tomato and cantaloupe.

Chlorine injury is usually acute and similar in pattern to sulfur dioxide injury. Foliar necrosis and bleaching are common. Sensitive crops are Chinese cabbage, Swiss chard, lettuce, beet, escarole, mustard, dill, pepper, potato, spinach, tomato, corn, onion, radish and cantaloupe.

In summary, when trying to solve a vegetable crop problem, look for a pattern in the symptoms, it is important to take complete notes of problem area, trace the history of the problem, and examine the plants and soil closely. Publications and bulletins designed to help the grower identify vegetable problems are available from your county Extension Office.

Some Relief from High Tunnel Stormwater Regulations

Jeff Stoltzfus | Farm Food Safety Educator | Penn State Extension

The Department of Environmental Protection(DEP) has recently withdrawn the guidance for townships around stormwater requirements for high tunnels. Many townships required had engineered stormwater plans for what is typically a field practice covered by NRCS. Previously, DEP guidance encouraged townships to treat high tunnels like permanent buildings. This current action by DEP takes away the financial burden for farmers who had often spent more money for the engineer, than for the high tunnel itself.

As growers look to high tunnels to increase efficiencies and extend the season for fresh produce, high tunnels have become a valuable tool in helping local growers compete with produce shipped in from warmer climates. Events of recent years, like pandemics and extreme weather, have exposed the vulnerability of relying heavily on produce from other areas. Millions of pounds of tomatoes are grown annually in Pennsylvania high tunnels. Moving them under plastic increases yields and reduces the number of acres needed to grow tomatoes. In addition, we are seeing several acres of tunnels being constructed to grow carrots and greens throughout the winter.

Many of the previous stormwater requirements involve the installation of permanent stormwater practices such as stone filled trenches along the sides of the tunnel or retention ponds. These would, of course, need to be reconstructed every time the high tunnel was moved leaving behind a series of earth disturbances that make the land unfarmable for the next crop. The earth moving required by these activities compacts the soil and reduces infiltration, often creating more runoff.

Although the guidance no longer calls for engineered plans, there are some Best Management Practices for constructing high tunnels in relation to stormwater. Tunnels of 30 feet width or less should have a 10-foot grass buffer to absorb some of the additional water that comes off of the tunnel. Tunnels should not be placed on steep slopes. Keep tunnels a reasonable distance from property lines and streams.

Keep in mind when we say High Tunnels, we are referring to structures that are placed over top of a crop growing in the soil. We do not refer to permanent greenhouses with excavated, gravel, or concrete floors as high tunnels. Also, tunnel structures that use gutters to concentrate the flow of water to one spot can cause problems that will require additional stormwater practices to prevent erosion. For more assistance with storm water management on your farm contact the NRCS.

Extending the Production Season with High Tunnels

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Introduction

For centuries a wide variety of techniques have been used to extend the growing season of horticultural crops. glass jars; glass cloches, hotcaps, cold frames, hotbeds, and greenhouses of various types have all contributed to season extension. More recently high tunnels have become popular with growers because of their simplicity and effectiveness in protecting crops from low temperatures, wind, and moisture stress in both spring and fall.

High tunnels do not offer the precision of conventional greenhouses for environmental control, but they do sufficiently modify the environment to enhance crop growth, yield, and quality. Although they provide some frost protection, their primary function is to elevate temperatures a few degrees each day over a period of several weeks.

In addition to temperature control, there are also the benefits of wind and rain protection, soil warming, and in some instances control of insects, diseases, and predators such as rodents and birds. Overall, this growing system should be considered a protected growing system that enhances earliness and promotes higher yields, improves quality and shelf life, and reduces the use of pesticides.

High tunnels have sufficient versatility to make them useful on a wide diversity of crops and in various cropping systems. Vegetables, small fruits, flowers and even tree fruits are all suited to this growing system; but the specific crops which might be grown will to a large extent depend on marketing opportunities for individual crops by individual growers.

High Tunnel System

High tunnels encompass a crop growing system that fits between row covers and greenhouses. They are relatively inexpensive (about $3.00/sq. ft, excluding labor), permitting a grower to enter into high tunnel crop production with limited capital. This system is particularly appealing to new-entry growers who utilize retail-marketing channels.

High tunnels are not conventional greenhouses. But like plastic-covered greenhouses, they are generally a peaked quonset-shape, constructed of metal bows that are attached to metal posts which have been driven into the ground about two feet deep. They are covered with a single layer of 6-mil greenhouse-grade polyethylene, and are ventilated by manually rolling up the sides each morning and rolling them down in early evening. There is no permanent heating system although it is advisable to have a standby portable propane heater to protect against unexpected below-freezing temperatures. There are no electrical connections. The only external connection is a water supply for trickle irrigation. Dr. Otho Wells, from the University of New Hampshire, was a pioneer in promoting the use of high tunnels in the northeastern United States and developed the New Hampshire design and system of production that involved covering the entire soil surface inside the tunnel with a solid sheet of 6-mil thick plastic. At Penn State we re-designed the endwalls so that they can be raised up to facilitate easy access into the tunnel with a small tractor and tiller and a system of production that uses 18- inch wide raised plastic mulch covered beds with drip irrigation tape buried 2-3 inches beneath the bed. The raised mulch beds are 44 inches apart, which allows 4 rows in a 17 foot wide high tunnel or 5 rows in a 21 foot wide tunnel.

General Suggestions for High Tunnel Management

High tunnels are not automated. Consequently, for maximum efficiency, they require regular daily attention, especially in the morning and evening, and during heavy rain events or strong winds. Temperature and humidity are the two critical factors that should be controlled as much as feasible. Early each morning, the sides should be rolled up to flush out the humidity and to keep temperature in check. The temperature in a closed high tunnel rises very rapidly on a clear morning! In other words, don't put off rolling up the sides. Ken-Bar Inc., Reading, MA. has developed a top vent that fits right on the plastic and can be used to ventilate a tunnel in the early spring and late fall when one does not really need to roll the sides up for temperature control. In the early evening, roll down the sides to entrap as much heat as possible. To increase soil and air temperatures within a high tunnel the following materials have been used successfully over the last four years: floating row covers, thermal blankets, hoop supported low tunnels (plastic film with or without ventilation holes or row cover material). Close the sides each evening until the night temperature reaches about 65oF. In the northeastern United States, this could mean that the sides would be rolled down each day well into the summer. Ventilation is best accomplished when wind moves through the tunnel from side to side; therefore orient the tunnel accordingly. The width of the tunnel also impacts ventilation. It is hard to be specific on the maximum width, but from experience, about 21-26feet seems to be the maximum high tunnel width that will allow for good ventilation, especially as plants grow taller and block the airflow.

Benefits of High Tunnels

The primary benefit of high tunnels is earliness. Tomatoes in a high tunnel mature on average about one month before field tomatoes. Earliness is the combination of being able to plant in high tunnels about two weeks earlier than in the open- field and faster ripening (about two weeks) inside the tunnel. Overall, the cost of a tunnel is usually recovered the first year when selling at retail prices. Another highly beneficial advantage of tunnels is disease control. The plastic cover acts like a rain shelter, the raised plastic mulch beds are a barrier against evaporation of soil moisture, and early morning ventilation reduces relative humidity. Therefore, the leaves of crops are dry for most of the day and night. Because of low humidity, plant leaves remain dry, impeding the incidence and spread of disease. Powdery mildew is the most serious and prevalent disease in high tunnels because the conditions in a high tunnel are more favorable for the development of this disease.

Crops

The following crops have been grown successfully in the high tunnels at Penn State High Tunnel Research and Education Facility.

Vegetables

The high tunnel allows growers to produce crops over a longer period of time and in some climates even produced year-round. Many times the plastic mulch is double-cropped with the first crop being removed and the second crop being planted on the plastic. The following vegetables have been grown successfully in the high tunnels: tomato (*Lycopersicon esculentum*), eggplant (*Solanum melongena*), pepper (*Capsicum annuum Grossum group*), muskmelon (*Cucumis melo*) summer squash (*Cucurbita pepo*), cucumber (*Cucumis sativus*), spinach (*Spinacia oleracea*), Swiss chard (*Beta vulgaris var. cicla*), lettuce (*Lactuca sativa*), broccoli (*Brassica oleracea var. italica*)., cabbage (*Brassica oleracea var. capitata*), cauliflower (*Brassica oleracea var. botrytis*), kale (*Brassica oleracea var. acephala*), kohlrabi (*Brassica oleracea gongyloides*), okra (*Abelmoschus esculentus*), onions (*Allium cepa*), leeks (*Allium ampeloprasum porrum*), garlic (*Allium sativum*), peas (*Pisum sativum*), specialty potatoes (*Solanum tuberosum*) for the red, white and blue potato salad for the 4th of July. In addition, a wide variety of herbs such as dill (*Anethum graveolens*) have been grown in the high tunnel.

Small Fruits

The extended production season and improved shelf-life of these products make high tunnel production a very viable option for the direct marketer. Primocane-bearing red raspberries (*Rubus idaeus*), and thornless blackberries (*Rubus subgenus Eubatus*) are produced on bare ground with drip irrigation. Strawberries (*Fragaria x ananassa*) are grown using the small raised bed with drip irrigation.

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Extending the Production Season with High Tunnels—*continued from page 13*

Cut Flowers

There are many options for cut flowers in the high tunnels ranging from herbaceous perennials over-wintered for spring cut-flower production to summer annuals, and natural season fall mums. This production system permits cut flowers to be harvested earlier in the spring and later in the fall compared to cut flowers grown in the field, and provides excellent flower quality.

Tree Fruit

Sweet cherries on dwarfing rootstock have been planted in high tunnels since 2000. Generally fruit tress are grown in large multiple bay temporary high tunnels such as those sold by Haygrove US. Benefits of growing sweet cherries in high tunnels appear s to be earlier maturity, elimination of fruit cracking and bird damage.

Summary

High tunnels can provide an ideal protective growing environment for any number of crops, but all crops might not be economical for any number of reasons. Therefore, a good approach to take would be to try different crops in light of market demands and marketing strategies. Although tunnels do require more manual attention than do greenhouses, the benefits of high tunnels in a diversified farm operation have proven to be a valuable asset in overcoming a short growing season and expanding the marketing season.

There are temperature limitations in high tunnels since they are not designed to be as warm as a greenhouse. Some type of supplemental heat should be available just in case there is a sudden unexpected drop in the temperature that would permanently injure the crop. The critical low temperature will depend on the crop. If the intent is to have a permanent heat source in a high tunnel, then if would be well to consider constructing a bona-fide greenhouse which easily could be used year around.

For addition information on plasticulture contact:

Penn State High Tunnel Production Guide is available for $30.00 U.S. dollars from
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Report: Tomatoes Statewide Cultivar Evaluation 2023

Elsa Sánchez, Tom Butzler, Tim Elkner, Bob Pollock, and Megan Chawner | Penn State Extension

Selecting which cultivar to grow is critical to successful vegetable production. When farmers grow high-yielding cultivars suited to an area, they can make a profit. However, because numerous cultivars are commercially available, it can be challenging to select the best ones. In this experiment, we aimed to provide farmers with up-to-date information for successful, region-specific cultivar selection.

Tomatoes are an important crop for Pennsylvania vegetable farmers. Field-grown tomatoes are grown on 1,586 farms comprising 3,297 acres (Census of Agriculture, 2017). This is up from 1,720 farms growing 2,655 acres in 2012 (Census of Agriculture, 2017). Additionally, 304 growers at the 2011 Mid-Atlantic Fruit and Vegetable Convention were asked, "What specific crops should researchers focus on in order to maintain your operation's profitability and that of the Mid-Atlantic vegetable and fruit Industry? Tomatoes came out as the top response of 18 listed crops. In 2022-23, we evaluated early maturing, determinate, large, red, slicing tomatoes at four locations representing different growing regions in Pennsylvania.

Methods

The study was conducted in western Pennsylvania at Yarnick's Farm in Indiana, central Pennsylvania at Pennsylvania State University's Russell E. Larson Research Center in Pennsylvania Furnace, southeastern Pennsylvania at Pennsylvania State University's Southeast Agricultural Research and Extension Center in Manheim, and northeastern Pennsylvania at the Seed Farm in Emmaus. A minimum of 11 cultivars and selections of early maturing, determinate, large, red, slicing tomatoes were evaluated at each site, with 'Red Deuce' serving as the standard.

We used plasticulture systems at all sites with raised beds, a single line of drip tape per bed, and black plastic mulch. At the western, central, and southeastern sites, synthetic pesticides and fertilizers were used, and certified organic methods were used at the northeastern site.

Five- to seven-week-old transplants were planted in mid-May to late June. Plots consisted of 6 plants in a single row with 18-inch in-row spacing and 6 - 10 ft between rows, depending on site. Plants were provided with 1 – 1.5 acre-inches of water each week. Pests and fertility were managed following recommendations in the 2022-23 Commercial Vegetable Production Recommendation guide at the western, central, and southeastern sites. Pests and fertility were managed following the National Organic Standard at the northeastern site.

Fruit were harvested when they reached the ripe red state. They were then categorized as marketable or unmarketable, counted, and weighed. At the southeastern site, marketable fruit were categorized as firsts or seconds. Marketable fruit was also graded using these sizes: extra-large (>3.5 inches diameter), large (2.75 – 3.5 inches diameter), medium (2 – 2.74 inches diameter), and small (<2 inches diameter).

A randomized complete block design was used, with each cultivar replicated four times. Data were collected from 6 plants per treatment per replication and were analyzed using the mixed procedure. Means were separated using pdiff.

Western Site

Highly unusual, unforeseen circumstances affected the tomato evaluation in the western site. In 2022, the data vanished at the Mid-Atlantic Fruit and Vegetable Convention before being stored on a computer. In 2023, uncertainty at the cooperator farm affected data collection.

Center Site

Five- to seven-week-old transplants were planted on May 25, 2022, and May 22, 2023. Plants were placed in a single row with 18-inch in-row spacing and were suckered approximately 3 weeks after transplanting. We planted annual ryegrass between rows primarily to suppress weeds. Having 10 feet between rows allowed us to mow the ryegrass periodically.

Harvest occurred weekly from July 21 to September 27, 2022, and August 2 to September 27, 2023.

Yield per plant of tomato cultivars grown at the Penn State University Russell E. Larson Agricultural Research Center in Pennsylvania Furnace, Pennsylvania, in 2022

Cultivar	Mean marketable fruit yield (lb/plant)	Mean marketable fruit yield (number/plant)	Mean unmarketable fruit yield (lb/plant)	Mean unmarketable fruit yield (number/plant)	Mean total fruit yield (lb/plant)	Mean total fruit yield (number/plant)
Red Deuce	**7.8***	**13.1 ab**	**7.9 abc**	**16.0 abc**	**15.8**	**29.1**
Patsy	7.3	16.8 a	5.4 c	15.4 abc	12.7	32.3
Carrie	7.2	14.0 ab	6.8 abc	14.7 c	14.0	28.7
STM 2255	6.7	11.7 ab	7.4 abc	15.4 bc	14.2	27.1
FTM 9744	6.3	12.4 ab	8.7 ab	18.2 abc	15.1	30.5
Red Snapper	6.2	9.5 b	9.2 a	16.8 abc	15.3	26.3
Mountain Fresh Plus	5.4	11.4 ab	6.8 abc	16.5 abc	12.1	28.0
Thunderbird	5.3	10.0 b	8.0 abc	18.3 abc	13.3	28.3
FTM 9745	4.9	10.1 b	6.1 bc	12.8 c	11.0	22.9
Rambler	4.5	8.8 b	8.6 ab	22.4 ab	13.1	31.3
Roadster	4.2	8.7 b	8.5 ab	22.5 a	12.7	31.2

**Values are means of six plants per replication and four replications; 'Red Deuce' (bolded) is the standard to which all other cultivars were compared; Values followed by different letters or within a column are statistically different at $P \leq 0.05$. A randomized complete block design was used for the experiment, with each cultivar replicated four times. Data were analyzed using the mixed procedure, and means were separated using pdiff. Please read this article for more information on interpreting tables like this: Science, Tomatoes, and How to Read a Table (psu.edu).*

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Report: Tomatoes Statewide Cultivar Evaluation 2023—*continued from page 16*

Yield per plant of tomato cultivars grown at the Penn State University Russell E. Larson Agricultural Research Center in Pennsylvania Furnace, Pennsylvania, in 2023.

Cultivar	Mean marketable fruit yield (lb/plant)	Mean marketable fruit yield (number/plant)	Mean unmarketable fruit yield (lb/plant)	Mean unmarketable fruit yield (number/plant)	Mean total fruit yield (lb/plant)	Mean total fruit yield (number/plant)
Red Deuce	**5.9***	**8.9 a-c**	**8.1 a-d**	**11.2 b-d**	**13.9**	**20.0 a-d**
Patsy	5.4	9.1 a-c	5.5 cd	9.5 d	10.8	18.7 cd
Carrie	5.3	9.4 ab	5.3 d	10.3 cd	10.5	19.6 b-d
STM 2255	4.4	7.3 bc	5.7 b-d	9.3 d	10.1	16.6 d
FTM 9744	4.8	9.5 ab	8.3 a-d	13.9 a-c	13.0	23.3 a-c
Red Snapper	4.8	6.1 c	9.0 a	12.7 b-d	13.7	18.8 cd
Mountain Fresh Plus	4.4	6.7 bc	8.3 a-d	12.2 b-d	12.7	18.9 cd
Thunderbird	3.6	6.3 c	7.1 a-d	12.6 b-d	10.7	18.8 cd
FTM 9745	6.3	10.7 a	9.6 a	13.7 a-c	15.8	24.4 a
Rambler	5.6	8.8 a-c	8.5 a-c	13.0 b-d	14.1	21.9 a-c
Roadster	4.0	7.1 bc	8.8 ab	14.5 ab	12.7	21.6 a-c
FTM 9743	4.3	6.7 bc	9.1 a	17.4 a	13.3	24.1 ab
Mountain Gem	4.4	7.2 bc	7.7 a-d	12.1 b-d	12.2	19.3 cd

**Values are means of six plants per replication and four replications; 'Red Deuce' (bolded) is the standard to which all other cultivars were compared; Values followed by different letters or within a column are statistically different at P ≤ 0.05. A randomized complete block design was used for the experiment, with each cultivar replicated four times. Data were analyzed using the mixed procedure, and means were separated using pdiff.*

Overall, yields were lower in 2023 compared to 2022, likely because we experienced a cooler growing season. In 2022 and 2023, none of the evaluated cultivars differed from 'Red Deuce' for mean marketable fruit by weight or number, mean unmarketable fruit by weight, and mean total fruit by weight and number. In 2023, the number of unmarketable fruit was higher from FTM9743 than 'Red Deuce'. This means that growing any of these cultivars using the same growing methods in similar environments will produce yields of tomatoes that are not different from 'Red Deuce' most of the time and are good options for Pennsylvania farmers.

A tomato cultivar evaluation in Delaware in 2019, using a plasticulture system with 6-foot center-to-center spacing, observed similar total yields for 'Red Deuce' (16 lb/plant and 31.9 fruit/plant in Delaware compared to 15.8 lb/plant and 29.1 fruit/plant in 2022 and 13.9 lb/plant and 20.0 fruit/plant in 2023; 2005 Seedless Watermelon Variety Trial: Varieties by Average Melon Weight (udel.edu)). However, the mean marketable fruit was much lower in our evaluation (13.7 lb/plant and 25 fruit/plant in Delaware compared to 7.8 lb/plant and 13.1 fruit/plant in 2022 and 5.9 lb/plant and 8.9 fruit/plant in 2023).

In our 2022 evaluation, we observed a large amount of unmarketable fruit from all cultivars, primarily due to raincheck, fruit cracking, and blossom end rot. Raincheck was a result of extreme rain events during fruit ripening. Raincheck incidence may increase as extreme rain events become more common late in the growing season due to the climate crisis. The cause of blossom end rot is unknown; however, fluctuating, and dry soil moisture conditions are thought to be involved. Also, in 2022, an issue with the irrigation water early in the growing season at the research site led to localized drought in our field. This problem was diagnosed and remedied; however, the water supplied was deficient for about 4 weeks. In 2023, we observed zippering, flower abortion, fruit cracking, brown marmorated stink bug damage, hornworm damage, septoria leaf spot, and early blight. As a result of this project, we wrote articles on these issues and how to read a table (titles below). They are/will be posted on the Penn State Extension website at extension.psu.edu.

Blossom End Rot, Internal Whitening, and Rain Check of Tomatoes (psu.edu)
Brown Marmorated Stink Bug Damage on Tomato (psu.edu)
Daño de chinche apestosa marrón (brown marmorated stink bug en inglés) en tomate
¿Nuestras plantas de tomate tienen Mancha Foliar de Septoria o Tizón Temprano?
Do our tomato plants have Septoria Leaf Spot or Early Blight?
Pruebas de gusano cuerno de tabaco y gusano cuerno de tomate en tomates
Evidence of Tobacco and Tomato Hornworm on Tomatoes
Tomato Flower Drop and Fruit Zippering
Gota de flor de tomate y cremallera de frutas

Planting ryegrass between rows was successful for suppressing weeds. We did not use herbicides or between-row cultivation all season long both years. Another benefit was that it was easier to walk in the fields after rain events. This action was a shift from relying on herbicides and extensive tillage to recognizing the interconnectedness between production practices and soil health. 'Red Deuce' was grown in a plasticulture system using 6 feet center-to-center spacing (we used 10 feet) and 18-inch in-row spacing (like our experiment) without a cover crop between rows in a Delaware study in 2019 (2005 Seedless Watermelon Variety Trial: Varieties by Average Melon Weight (udel.edu)). Yields per plant were similar to what we observed in our study. Plant populations per acre are higher using 6-foot centers compared to 10-foot. It may be possible to use ryegrass with 6-foot row spacing, depending on the equipment available. Regardless, the benefits we observed using ryegrass should be factored into deciding which system to use.

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Report: Tomatoes Statewide Cultivar Evaluation 2023—*continued from page 17*

Yield per plant of tomato cultivars by size grown in Central Pennsylvania in 2022.

Cultivar	Mean extra-large fruit weight/ plant (lb)	Mean extra-large fruit number/ plant	Mean large fruit weight/ plant (lb)	Mean large fruit number/ plant	Mean medium fruit weight/ plant (lb)	Mean medium fruit number/ plant	Mean small fruit weight/ plant (lb)	Mean small fruit number/ plant
Red Deuce	**1.8* a**	**2.0 a**	**5.5**	**9.3**	**0.6 b**	**1.8 b**	**0.0**	**0.0**
STM 2255	1.3 ab	1.5 ab	4.9	8.4	0.6 b	1.8 b	0.0	0.1
Red Snapper	1.1 abc	1.2 abc	3.8	6.4	1.3 ab	1.8 b	0.0	0.1
Thunderbird	0.7 abc	0.8 bcd	4.0	7.0	0.6 b	2.1 b	0.0	0.0
Carrie	0.6 bc	0.7 bcd	5.3	9.8	1.3 ab	3.3 b	0.0	0.2
FTM 9745	0.5 bc	0.6 bcd	3.5	6.7	0.9 b	2.7 b	0.0	0.1
FTM 9744	0.4 bc	0.5 bcd	4.5	8.0	1.4 ab	3.6 b	0.0	0.3
Rambler	0.4 bc	0.4 bcd	3.4	6.0	0.8 b	2.4 b	0.0	0.0
Patsy	0.3 bc	0.3 cd	5.1	9.8	1.9 a	6.3 a	0.1	0.5
Mountain Fresh Plus	0.2 c	0.3 cd	3.9	7.2	1.1 ab	3.6 b	0.1	0.3
Roadster	0.0 c	0.0 d	3.2	5.8	1.0 ab	2.8 b	0.0	0.1

**Values are means for individual heads; 'Red Deuce' (bolded) is the standard to which all other cultivars were compared; Values in the green text within a column are significantly larger than 'Red Deuce', values in the red text within a column are significantly smaller than 'Red Deuce'.*

Yield per plant of tomato cultivars by size grown in Central Pennsylvania in 2023.

Cultivar	Mean extra-large fruit weight/ plant (lb)	Mean extra-large fruit number/ plant	Mean large fruit weight/ plant (lb)	Mean large fruit number/ plant	Mean medium fruit weight/ plant (lb)	Mean medium fruit number/ plant	Mean small fruit weight/ plant (lb)	Mean small fruit number/ plant
Red Deuce	**2.0* ab**	**2.5 ab**	**3.7ab**	**6.3 ab**	**0.1 d**	**0.1 c**	**0.0**	**0.0**
STM 2255	1.6 ab	2.0 ab	2.6 a-c	4.5 b-d	0.3 bcd	0.9 bc	0.0	0.0
Red Snapper	3.1 a	3.3 a	1.6 c	2.6 d	0.1 d	0.3 c	0.0	0.0
Thunderbird	1.0 b	1.3 b	2.4 bc	4.3 b-d	0.2 cd	0.7 bc	0.0	0.0
Carrie	1.5 ab	1.9 ab	3.4 ab	6.6 a	0.3 b-d	0.9 bc	0.0	0.0
FTM 9745	1.8 ab	2.5 ab	4.0 a	7.0 a	0.5 bc	1.6 ab	0.0	0.0
FTM 9744	0.7 b	0.9 b	3.1 a-c	6.0 a-c	1.0 a	2.7 a	0.0	0.0
Rambler	2.1 ab	2.4 ab	3.3 ab	5.8 a-c	0.3 b-d	0.7 bc	0.0	0.0
Patsy	1.5 b	1.7 ab	3.3 ab	5.8 a-c	0.7 ab	1.7 ab	0.0	0.0
Mountain Fresh Plus	2.0 ab	2.3 ab	2.3 bc	4.1 cd	0.1 d	0.3 c	0.0	0.0
Roadster	0.7 b	0.9 b	3.1 ab	5.6 a-c	0.2 cd	0.7 bc	0.0	0.0
FTM 9743	1.6 ab	2.0 ab	2.5 bc	4.1 cd	0.2 cd	0.6 bc	**0.0**	**0.1**
Mountain Gem	1.9 ab	2.1 ab	2.2 bc	4.1 cd	0.4 bcd	1.1 bc	**0.0**	**0.1**

**Values are means for individual heads; 'Red Deuce' (bolded) is the standard to which all other cultivars were compared; Values in the green text within a column are significantly larger than 'Red Deuce', values in the red text within a column are significantly smaller than 'Red Deuce'.*

continued on page 19

Report: Tomatoes Statewide Cultivar Evaluation 2023—*continued from page 18*

In 2022, the mean weight of extra-large fruit was higher from 'Red Deuce' than 'Carrie', FTM 9745, FTM 9744, 'Rambler', 'Patsy', 'Mountain Fresh Plus', and 'Roadster'. The mean number of extra-large fruit was higher from 'Red Deuce' than 'Thunderbird', 'Carrie', FTM 9745, FTM 9744, 'Rambler', 'Patsy', 'Mountain Fresh Plus', and 'Roadster'. 'Red Deuce' was not different from any other cultivar by large fruit weight or number. 'Patsy' produced a higher yield of medium-sized fruit by weight and number than 'Red Deuce'. None of the other cultivars produced different amounts of medium-sized fruit than 'Red Deuce'. No differences were seen between cultivars in the small fruit category.

In 2023, the mean weight and number of extra-large fruit per plant from 'Red Deuce' were 2.0 lb and 2.5 lb, respectively. All other cultivars did not produce different amounts of large-sized fruit than 'Red Deuce'. 'Red Snapper' produced a lower mean weight of extra-large fruit than 'Red Deuce'. All other cultivars were not different than 'Red Deuce'. 'Red Snapper', 'Mountain Fresh Plus', FTM 9743, and 'Mountain Gem' produced fewer large fruit by number than 'Red Deuce'. All other cultivars did not produce different amounts of large fruit than 'Red Deuce'. FTM 9745, FTM 9744, and 'Patsy' produced more medium-sized fruit by weight and number than 'Red Deuce'. None of the other cultivars produced different amounts of medium-sized fruit than 'Red Deuce'. No differences were observed between cultivars in the small fruit category.

In 2023, we observed that FTM 9743, FTM 9744, and FTM 9745 produced many fruit with a pointed blossom end, as shown in the following photos.

'Red Deuce' and 'Red Snapper' are options for farmers with a market for extra-large fruit. In both years of the evaluation, the largest size category for fruit was large. 'Red Deuce', STM 2255, 'Thunderbird', 'Carrie', FTM 9745, FTM 9744, 'Rambler', 'Patsy', and 'Roadster' produced consistent yields of large fruit by weight and number. 'Patsy' is a good option for medium-sized fruit. Very few fruit were small from the cultivars evaluated. Farmers with markets for small fruit should consider other cultivars.

To be continued in PGA News Issue 3

Research Funded by PA Growers
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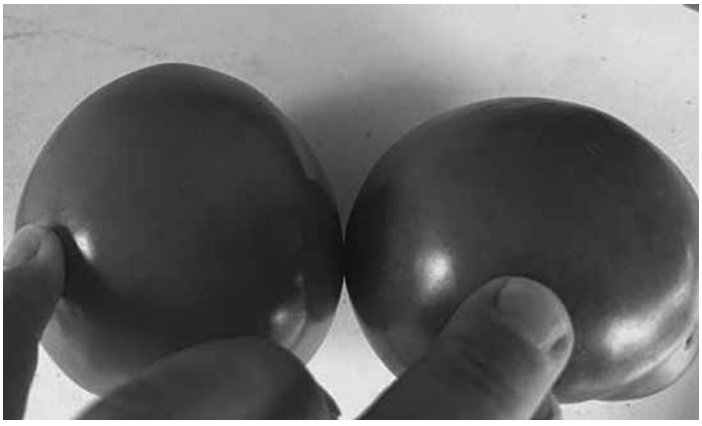
FTM 9743 fruit showing a pointed blossom end.
Photo: Tom Butzler

FTM 9744 fruit. Note that several have a pointed blossom end.
Photo: Tom Butzler



FTM 9745 fruit on the left showing a pointed blossom end compared to another cultivar.
Photo: Tom Butzler

Four Receive PVGA Scholarships

The Pennsylvania Vegetable Growers Association is pleased to be able to offer Rudolph Grob Memorial Scholarships each year to students pursuing higher education. For 2023 four scholarships were given as follows:

Nicholas Colitas | Messiah University

Nicholas is the sone of Deb and Chris Colitas of Nazareth, PA. He is majoring in business with an interest in Farm Management. He has worked on his family's strawberry farm (Valley Fruits & Veggies in Bethlehem, PA), taking on more responsibilities each year, from cashier and field picker to manager and farm planner. He hopes to take his new education and experiences to continue the family legacy of owning our farm.

Clayton Harner | Penn State University

Clayton is the son of Chris Harner and Tarrah Geszvain of State College, PA. He is majoring in Agricultural Science with the goal of understanding what is necessary to successfully run a business in the agricultural field and possibly have a role in cooperative extension. He works on his family's fruit and vegetable farm which includes a retail farm market and agritainment activities.

Matthew Kaelin | Penn State

Matthew is the son of Jennifer and Curt Kailin. He is majoring in Plant Science. He has been involved with his family farm his entire life. While they grow a multitude of vegetables and fruits, their main crops are sweet corn, pumpkins, and tomatoes. He enjoys being out in the field and learning to be the best grower he can be. He hopes to take a spot in the business alongside his parents and improve their business.

Reagan Kelley | Mansfield University

Reagan is the daughter of Curtis and Tresa Kelley of Canton, PA. She is majoring in Environmental Science with the goal of working at her family's farm growing crops and managing the market. She has had her own goat farm (Diamon Rays Farm) since she was 12-years old. She owns nine dairy goats and uses their milk to make homemade soaps which she sells at their farm stand. She also works part-time at a vet clinic and at a local feed store. After graduation, she plans to work at her family's farm growing crops and managing the market, using the information she has learned to be able to operate the farm in an environmentally friendly manner as well in a way that can effectively feed those who rely on the crop.

The Association gives the annual scholarships in memory of Rudolph Grob of Millersville who served the Association for 50 years as a Director, 20 years as Secretary Treasurer and for over 20 years as manager of the Association's Farm Show Booth. Mr. Grob was a horticulture graduate of Penn State University who was employed for many years at Funks Farm Market in Millersville. The funds for the scholarships are generated by the interest earned by the Association's Keystone Fund, an endowment-type fund created by the voluntary extra dues paid the Keystone Members of the Association.

The purpose of the scholarship is to assist students in obtaining a baccalaureate or associate degree that will enable them to pursue a career in the vegetable, potato or berry production or related industries or businesses. Children or grandchildren of an Association member who has been a member in good standing for one or more years and who are pursuing a degree in an agriculture-related field may also be considered.

Preference will be given first to children or grandchildren of Association members who are pursuing career in the vegetable, potato or berry production or related industries or businesses. Second preference will be given to non-member students who are pursuing a career in the vegetable, potato or berry production or related industries or businesses. Last preference will be given to children or grandchildren of members who are pursuing a degree in an agriculture-related field but not necessarily in the vegetable, potato or berry industries.

Applicants must be currently enrolled or be planning to enroll in a two-year associate or four-year baccalaureate degree program at an accredited institution and be in good academic standing.

More information can be found on PVGA's website at www.pvga.org.

Information and recipe Corner

New to PVGA News! Each issue will feature information and a recipe on vegetables. If you would like to contribute to this new 'corner' submit your information and recipe to pvga@pvga.org. Pictures are also welcome.

Spinach

Art King | PVGA Board Member

By now you may have spinach growing in your high tunnel or maybe even some that over-wintered in the field. We have quite an advantage in marketing spinach since it has been on that dirty dozen list. It's really ironic for us since we never spray spinach with anything. It's one of those vegetables for us that we can never get enough of. It is, of course, one of the top nutritional foods you can eat. Here is the scoop on Spinach:

Of course, spinach is good for you, remember Popeye? Well, I don't recommend eating it through your pipe, or eating it out a can, for that matter. And I can't guarantee it will give you bulging muscles and superior strength. But spinach does contain a powerful nutrient combination that makes it extremely healthy to eat. Only carrots and parsley are higher in Beta Carotene. Your body changes beta carotene into vitamin A as you need it. It is also a good source of nine other vitamins which are, in most cases, bioavailable in spinach. Spinach is nature's #1 source of Alpha Lipoic Acid, a potent antioxidant and cancer fighter. To put it lightly….If you eat your spinach you will be "strong to the finish."

Spinach with pine nuts

2 garlic cloves, minced
3 tablespoons olive oil
1 ½ lbs fresh spinach, trimmed, washed and dried or 2 (10 ounce) packages frozen spinach, thawed and drained
½ cup pine nuts, lightly toasted (toast 6 to 8 minutes at 350 degrees F)
Salt and pepper to taste
Directions

1. Sauté garlic in olive oil in large skillet until soft.
2. Add spinach and cook until tender and fairly dry.
3. Add pine nuts to skillet and cook until moisture is barely absorbed.
4. Season with salt and pepper and serve.

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