



## Don't Miss These PVGA Sponsored Summer Educational Events

The Pennsylvania Vegetable Growers Association is sponsoring a series of educational events for growers across the state as part of our effort to keep growers updated on the latest methods in profitable vegetable and small fruit production. Be sure to take advantage of these opportunities to get off your farm for a day or an evening to see how other growers are meeting production challenges. You also have the chance to visit with fellow growers and share ideas, problems and solutions.

Tuesday, July 15, 2014

### Twilight Tour at Tuscarora Organic Growers Cooperative & New Morning Farm

This twilight meeting will feature a tour of the Tuscarora Organic Growers Cooperative (TOG) and New Morning Farm. TOG is focused on small scale organic wholesale distribution from New Morning Farm as well as others from surrounding farms in the region. This program will feature a behind the scenes farm tour of both facilities and a discussion on small-scale wholesale success strategies for area growers.



TOG is a grower owned cooperative featuring over 1,200 produce items annually that coordinates with over 50 farms resulting in over \$3 million in sales annually. New Morning Farm is a 95-acre certified organic vegetable farm focused on retail sales outlets through year-round growing technology. The farm features heated greenhouses, extensive irrigation systems, two high tunnel cold frames and a 300 free-range laying hen operation.

The twilight meeting will begin at 6:00 p.m. and go to 8:00 p.m. at Tuscarora Organic Growers Cooperative, 22263 Anderson Hollow Road in Hustontown. Since GPS units don't always give reliable directions to the location, use the following directions: From I-76 (PA Turnpike) - Take exit 180 for US 522 and go north (right) one mile on US 522 towards Ft. Littleton and Mt. Union. Turn left onto Sinoquipe Rd. and go 5.2 miles (until it stops at a T). Turn left onto PA-475 S. and go 0.6 miles. Turn right onto Anderson Hollow Rd and go to the end

There is no fee to attend this event. However, pre-registration by noon on July 15 is requested.

To register, contact Carla Snyder at 717-334-6271 or [snyder.carla@psu.edu](mailto:snyder.carla@psu.edu) OR visit <http://extension.psu.edu/plants/tree-fruit/events/twilight-tour-tuscarora-organic-growers-cooperative-new-morning-farm-1>.

Tuesday, July 15, 2014

### Central Susquehanna Summer Vegetable Meeting

Topics for this summer's twilight include a vegetable disease update, vegetable insect update, and a water quality discussion. Our speakers will be Plant Pathologist Dr. Beth Gugino, Entomologist Dr. Shelby Fleischer, Water Specialist Bryan Swistock, and Educator Amy Galford. We will also have a walking tour to look at current pest problems and discuss potential pest problems.

The meeting will be from 6:00 p.m. to 8:30 p.m. at the Linus Martin, Jr. farm three miles south of Mifflinburg at 736 Hess Road. Take PA 304 south to Wild Road.



Turn right onto Wild Road and go one mile. Turn left onto Hess Road. The farm is at the end of the road - if you drive into Penn's Creek, you went too far!

Linus Martin Jr. grows 14 acres of vegetables and 57 acres of grains. Linus grows eight acres of pumpkins, four acres of cantaloupe, one acre of watermelon, and a half acre of tomatoes. He uses Penn's Creek for irrigation. All of his produce is marketed through the Buffalo Valley Produce Auction.

A representative of the Penn State Extension Water Team will be on hand to help you process a sample of your irrigation water for pH, alkalinity, and EC. We will also be discussing bacterial contamination of water and methods of treatment as it relates to GAP, FSMA and general food safety.

Attendees are encouraged to bring a sample of your irrigation water to be tested on-site for pH, alkalinity, and electrical conductivity (dissolved solids). To collect a sample of your water, follow these directions:

**Water Sample Collection Instructions** - Open and empty a new bottled water container (at least 12 oz.). Triple rinse the container with your irrigation water, then fill the container to the top and seal with the cap. Be careful not to touch the bottle lip or inside the cap with your fingers, or to let the cap or lip touch the ground. Collect the sample as close to the program time as possible and keep it cool and covered or in the dark.

No pre-registration necessary. For questions contact John Esslinger at 570-784-6660 or [cje2@psu.edu](mailto:cje2@psu.edu).

*(continued on page 2)*

## NEWS



**Pennsylvania  
Vegetable Growers  
Association**

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

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Richfield

## **Don't Miss These PVGA...** *(continued from page 1)*

Monday, July 21, 2014

### **Northwest Pennsylvania GAPs Mock Audit**

This mock GAPs audit will take place from 3:30 to 5:30 pm. at Troyer Land Resources, 724 Route 97 in Waterford. Join a PDA auditor as he walks through a local farm discussing how an audit is conducted and what to expect. The walking mock audit will be preceded by an introduction to GAPs and PDA's cost-share program. A question-and-answer period will follow. There is no registration cost and light refreshments will be provided. For further information contact Hannah Grose at hbg11@psu.edu or 717-334-6271 Ex 325/ To register, go to <http://extension.psu.edu/tree-fruit/events> or call Ms. Grose.

July 30, 2014

### **Berks Summer Vegetable Twilight Meeting**

This annual grower gathering will be held from 5:00 to 9:00 p.m. at the Kutztown Produce Auction at 209 Oak Haven Road in Fleetwood. Topics for this summer's twilight include pollinators, vegetable insect update, and water quality. Dr Shelby Fleisher, Penn State Entomologist will discuss recent research on squash bees, bumble bees, other native bees, how to improve nutrition of pollinators and build up populations of native bees. He will also review vegetable insect problems so far this season. Steve Fink from Meadow View Bees and the Lehigh Valley Beekeepers Assoc. will give a hands-on honey bee demo. A representative of the Penn State Extension Water Team will be on hand to help growers process a sample of their irrigation water for pH, alkalinity, and electrical conductivity (dissolved solids). (See [sample collection instructions under the Central Susquehanna meeting information above.](#)) The Water Team will also be discussing bacterial contamination of water and methods of treatment as it relates to GAP, FSMA and general food safety. A core credit will be offered

No pre-registration is necessary. Registration will be \$10.00 at the door and includes supper. For further information contact Tanner Delvalle at [tcd125@psu.edu](mailto:tcd125@psu.edu) or 570-622-4225.

August 13, 2014

### **At-Market Twilight Meeting**

This marketing twilight meeting will be held from 6:30 to 8:30 p.m. at The Produce Crib at Juniperdale Farm, 1015 Browntown Road in Nazareth. Join us at Fulmer's diverse produce farm and market for an evening of education. We will be discussing the science and art of profitable pricing as well as exploring the many design variations of appropriate signage. We will have time to include our observations on this season's production challenges. There will also be seasonal refreshments for all!

For further information and registration, contact John Berry at [johnberry@psu.edu](mailto:johnberry@psu.edu) or 610-391-9840. There is no registration fee.

August 5, September 2 and October 7, 2014

### **Urban Farming Twilight Discussion Series**

This is a series of educational evening meetings for the benefit of the growing audience of urban vegetable farmers in and near Philadelphia. See the schedule below for details.

August 5 – [High Tunnels](#) – Saul High School

Dr. William Lamont and Thomas McCann will be covering growing seedlings plus planting, cultivating, harvesting, washing, drying and storing produce.

September 2 – [Intensive Growing Methods and Equipment for Small Farms](#) – Heritage Farm

Carla Snyder and others will be discussing the use the raised beds, SPIN, and small farm equipment.

October 7 – [Soil Health Evaluation](#) – Aubury

Richard Steyhauer and Patrick Drohan will discuss the biology of soils and compost. Soil samples will be microscopically examined.

For more detailed information on any of these sessions, contact PhiladelphiaExt@psu.edu or 215-471-2200. There are no registration fees.

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*The Pennsylvania Vegetable Growers News is the official monthly publication of the Pennsylvania Vegetable Growers Association, Inc., 815 Middle Road, Richfield, PA 17086-9205 phone and fax - 717-694-3596, email - [pvga@pvga.org](mailto:pvga@pvga.org) website - [www.pvga.org](http://www.pvga.org)*

*Our Mission:*

*The Pennsylvania Vegetable Growers Association serves Pennsylvania's commercial vegetable, potato and berry growers*

*through education, research, advocacy and promotion.*

*Our Vision:*

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

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

## Ag Census Shows Pennsylvania Vegetable Acreage, Farms Drop

The numbers reported from the 2012 Census of Agriculture show a drop in both the number of acres of vegetables grown in Pennsylvania and the number of vegetable farms. The table below shows the statistics for crops with more than 50 acres harvested in 2012.

	2012	2012	2007	2007
Crop	Farms	Acres	Farms	Acres
Vegetables harvested	3,968	49,397	4,338	55,655
0.1 to 0.9 acres	619	279	803	(D)
1.0 to 4.9 acres	1,753	3,806	1,890	4,003
5.0 to 14.9 acres	1,008	7,980	963	7,808
15.0 to 24.9 acres	235	4,410	255	4,738
25.0 to 49.9 acres	178	5,855	205	7,014
50.0 to 99.9 acres	81	5,443	117	7,707
100.0 to 249.9 acres	69	11,046	76	11,375
250.0 to 499.9 acres	19	6,458	21	6,713
500.0 to 749.9 acres	4	(D)	6	3,660
750.0 to 999.9 acres	2	(D)	-	-
1,000.0 acres or more	-	-	2	(D)
Asparagus	230	146	211	169
Beans, snap	1,181	10,723	1,065	9,348
Beets	269	111	187	67
Broccoli	245	325	218	183
Cabbage, head	378	1,090	361	1,146
Cantaloupes	549	1,121	480	805
Carrots	105	77	63	85
Cauliflower	148	108	120	96
Cucumbers/Pickles	410	337	348	609
Eggplant	199	83	123	60
Garlic	161	63	93	(D)
Kale	103	(D)	24	10
Lettuce, all	195	128	136	104
Onions, dry	276	(D)	138	107
Onions, green	152	52	79	29
Peas, green	109	95	80	125
Peppers, Bell	1,233	939	1,038	986
Peppers, not Bell	629	303	500	232
Potatoes	1,330	8,659	1,258	9,690
Pumpkins	1,578	6,188	1,690	7,717
Squash, summer	366	351	284	488
Squash, winter	270	595	210	323
Sweet corn	1,898	12,715	2,342	17,219
Sweet potatoes	93	50	54	38
Tomatoes	1,720	2,655	1,737	3,458
Turnips	77	50	52	43
Watermelons	516	761	413	647

(D) = data withheld to avoid disclosing data for individual farms

## “Are You Crazy?” Farm Market Tour Set for July

The 18th annual “Are You Crazy?” Tour of retail farm markets will be held July 22 & 23, 2014. The tour will feature seven premiere retail farm markets and one food manufacturer — with plenty of ideas, education, food, and fun for all. This year we are exploring what Maryland has to offer. These farms and markets are major providers of fruits, berries, vegetables, prepared foods, and agri-tourism.

A new feature for the tour is that each stop will be sharing information on a specialty topic — an area where they have experience and can pass some tips on to others.

We have something for everyone — seasonal, year-round, produce, food, tourism, value-added, pick-your-own, entertainment, and educational farm direct-to-consumer marketing at its finest! Not to mention the “classroom-on-wheels” as we travel between markets with opportunities to network and learn from each other. New this year! Each business we visit will share info on a “Specialty Topic”.

The tour is designed for any farm market owner, manager, or other personnel interested in seeing and learning from a variety of retail farm market and agri-tourism entrepreneurs.

We will tour each operation and focus on what has made it a success. The emphasis is on seeing what others are doing, peer networking, sharing, and learning.

We will be touring:

### Catoctin Mountain Orchard, Thurmont, MD

Catoctin Mountain Orchard is a four-generation farm with a diversified orchard operation growing fruit, berries, and vegetables on 125 acres. Their tomatoes, cantaloupes, squash, peppers, eggplant, kale, and cabbage are grown on black plastic using a high-bedder to apply fertilizer and lay miles of tubing for trickle or drip irrigation. Each year they plant new variety test trees looking for the best tasting fruit! A half-acre of kiwi berries are their newest venture. They offer fruit, vegetables, a bakery, pick-your-own fruit, cut-your-own flowers, farm market, and farm tours.

\*Specialty Topic: A visit to the top of the Orchard for an breath taking view of the farm discussing the “diversity” of crops including the varieties of plums, continuing to the retail market to explore the market, cold storages, freezer, and bakery.

[www.catoctinmountainorchard.com](http://www.catoctinmountainorchard.com)

### Baughner Farm, Westminster, MD

Celebrating over 100 years in Carroll County, Baughner's Orchard has been a working fruit and vegetable farm since 1904. This 600 acre operation is one of the largest orchards in Westminster, Maryland. Their operation includes a family restaurant, two markets, pick-your-own, a bakery (featuring over 20 varieties of pies, breads, and pastries), their own apple cider, a fall pumpkin patch and hayrides, playgrounds, and a petting zoo.

\*Specialty Topic: Management of large crowds during the busy season. In October they employ 130 people and serve up to 5,000 visitors each day.

[www.baughners.com](http://www.baughners.com)

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## NEWS

**“Are You Crazy?”**...*(continued from page 3)***McCutcheon's Apple Products, Inc.,** Frederick, MD

McCutcheon's Apple Products is a four-generation family owned company geared toward serving small businesses. They produce all natural gourmet fruit preserves and butters, jellies, juices, condiments, sodas, and much more. Since 1938, they have worked to create a broad line of outstanding products and build exceptional relationships with customers and supporters. In an effort to bring more green practices into their business, they are going solar by installing an array of solar panels which will fully power the factory operation.

\*Specialty Topic: Explore a large scale food manufacturer with a tour of the factory.

[www.mccutcheons.com](http://www.mccutcheons.com)

**Butler's Orchard,** Germantown, MD

Butler's Orchard is a family farm providing good green fun and local produce for over 60 years. They operate a farm market, pick-your-own, bakery, field trips and events such as group hayrides and bonfires, strawberry blossom tours, group pick-your-own outings, Bunnyland, and Pumpkin Harvest Days. Butler's is an Integrated Pest Management Farm with a professional scout who consults with them weekly to check their crops for insects and disease pressures, allowing them to reduce applications and move toward more sustainable production systems.

\*Specialty Topic: Pick-Your-Own: reducing theft, while improving the customer experience.

[www.butlersorchard.com](http://www.butlersorchard.com)

**Larriland Farm,** Woodbine, MD

Larriland Farm is family owned and operated by Larry and Polly Moore. They have a farm market, but they are recognized as a pick-your-own farming operation which started in 1973. They grow tart and sweet cherries, strawberries, thornless blackberries, black, red, and purple raspberries, blueberries, peaches, apples, and vegetables including spinach, tomatoes, beets, broccoli, and pumpkins.

\*Specialty Topic: How they manage a large Pick-Your-Own operation.

[www.pickyourown.com](http://www.pickyourown.com)

**Richardson Farms of White Marsh,** White Marsh, MD

There are three generations of the Richardson family involved in the day-to-day operations. Not only have they managed the largest farm stand in the Northeast Market in Baltimore, Maryland since 1930, in 2010 the new On-Farm Market was opened. Under the supervision of their Executive Chef, the kitchen and deli prepares whole, carryout meals, or your choice of delicious food items such as rotisserie chickens, slow-smoked barbeque, cheese, deli meats, fantastic desserts, and more. Richardson Farms grows more than 300 acres of fresh produce and provides locally grown fresh vegetables to area wholesalers.

\*Specialty Topic: “Chefing” and how to incorporate foods from the farm into restaurant menus.

<http://richardsonfarms.net>

**Weber Cider Mill Farm,** Baltimore, MD

Since 1908, over four generations of the Weber family have been market gardeners and fruit growers. Weber's Cider Mill Farm is Maryland's oldest cider mill in continuous use. Their farm includes a farm market, bakery, and gift shop. The farm market features summer fruits and vegetables, including 45

varieties of peaches and continues into fall harvest with over 20 varieties of apples, their cider, and fall fruits and vegetables. The bakery produces over 20 different types of pies, cider donuts, hand-dipped ice cream, fudge, apple cider, and fruit slush. Their gift shop offers baskets, children's books, soy candles, and home décor.

\*Specialty Topic: Cider processing and varietal ciders.

[www.weberscidermillfarm.com](http://www.weberscidermillfarm.com)

**Milburn Orchards,** Elkton, MD

Family owned and operated since 1902 Milburn Orchards is now run by the fourth generation of the Milburn family. Milburn Orchards provides families with high quality farm fresh fruits and vegetables, available in their farm market or wholesale. For more than 100 years, families have been driving from Pennsylvania, New Jersey, Delaware, Maryland and points beyond to visit the Milburn Orchards. Two years ago they built an addition onto the original building, which more than doubled the size of the market.

\*Specialty Topic: Transitioning into a new market facility.

[www.milburnorchards.com](http://www.milburnorchards.com)

Lunch on Tuesday & Wednesday & supper on Tuesday will be at the markets we are visiting.

**Registration**

Pre-registration is necessary because of bus and lodging reservation requirements and will be honored on a “first-come, first-served” basis. Registrations will be accepted after June 30, 2014, on a space available basis only. All major credit cards and checks accepted. No refunds after June 30, 2014. To register, go online to: <http://tinyurl.com/AYCTrip>. For assistance with registration: 610-391-9840, Monday – Friday, 8:00 a.m. to 4:30 p.m.

The registration fee covers the tour bus transportation, one night at a hotel (breakfast on your own), reference materials, refreshments, dinner on Tuesday, and lunch on both days.

Your registration fee depends on how many you have sleeping in your hotel room:

One person/room tour fee: \$320.00

Two people/room tour fee: \$255.00 each

Three people/room tour fee: \$235.00 each

Four people/room tour fee: \$225.00 each

We will be boarding our tour bus at three locations:

6:00 a.m. at the Lehigh County Ag Center parking lot: 4184 Dorney Park Road, Allentown, PA 18104-5798

7:15 a.m. at Penn State Extension Lancaster County Farm & Home Center parking lot: 1383 Arcadia Road, Lancaster, PA 17601-3184 Park in the west corner, near Route 30.

8:45 a.m. at Penn State Extension Adams County parking lot: 670 Old Harrisburg Road, Gettysburg, PA 17325-3404

NOTE: The bus will depart promptly. Please be prepared to be on time, or better, a little early.

Expected to arrive back Wednesday, July 23rd in:

Lancaster around 5:55 p.m.

Gettysburg around 6:55 p.m.

Allentown around 7:25 p.m.

The tour is sponsored by the Pennsylvania Retail Farm Market Association, Penn State Extension, PVGA, Pennsylvania Department of Agriculture, USDA and Risk Management Agency.



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### How Long will BioTelo Agri Last?

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### What is BioTelo Agri made from?

BioTelo Agri is wholly composed of Mater-Bi, a corn-starch based material whose complete biodegradability has been certified by The Belgian Institute of Organic Waste System as part of the certification program "OK Compost", "OK Biodegradable Soil", as well as other international institutions such as AIB Vincotte (Belgium), Dincertco (Germany), and IIP Italy.



**And remember, if the label on the roll does not say BioTelo Agri, it's not**

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## NEWS

## National News Briefs

### United Fresh Disappointed in Action by House Appropriations Committee to Roll Back School Nutrition Standards

The House Appropriations Committee, after a lengthy debate, rejected by a 29-22 vote an amendment to strike a controversial rider from its agriculture spending bill that would allow some schools to opt out of nutrition rules that mandate serving fruits and vegetables. The United Fresh Produce Association sent a letter to key lawmakers urging them to protect the school nutrition standards. United Fresh President & CEO Tom Stenzel issued the following statement in response to the action by the House Appropriations Committee:

"We believe there is strong support both at USDA and among a majority of House members to find ways to help schools adjust to some of the more technical requirements of the rules regarding sodium and whole grains, but preserve the critical importance of serving at least one half-cup of fruits and vegetables in school meals. Serving one-half cup of fruits and vegetables, in ways that kids love and want to eat, is one goal that we can accomplish together. Granting a waiver to that basic, minimal standard is unacceptable to even describe items on a school lunch tray as a "meal." The fresh produce industry is committed to providing school foodservice directors with technical assistance, training in produce procurement and handling, and sharing best practices of what's working in thousands of schools across the country.

"As the Appropriations bill comes forward to the House floor, we urge members to work together on a bipartisan basis to strike the blanket variances allowing schools to opt out of all nutrition standards, and instead develop language that supports flexibility where it's really needed, without rolling back the very basic principle that school meals need to include at least a half-cup of fruits and vegetables.

"If the House moves forward with a blanket variance allowing schools to opt out of serving at least one-half cup of fruits and vegetables — over the objections of the national PTA, respected school nutrition leaders, and the entire public health community — parents in every congressional district across the country will be outraged."

*From **Inside United Fresh**, United Fresh Produce Association, May 29, 2014.*

### Farm Bureau Tells Congress to "Ditch the Rule" at Hearing as Opposition Gains Steam

Cambria County Farm Bureau President Tommy Nagle told members of the House Transportation and Infrastructure Committee that federal agencies need to "Ditch the Rule," when it comes to expanding jurisdiction of the Clean Water Act.

Nagle, who participated on behalf of Farm Bureau, provided testimony during a hearing hosted by the House committee in Altoona. The committee, chaired by Rep. Bill Shuster, took testimony on a recent rule proposed by the U.S. Army Corps of Engineers and the Environmental Protection Agency to expand land areas governed by the Clean Water Act. If the proposed regulations move forward, virtually every drop of water will fall under federal jurisdiction.

The result could be that farmers would need federal permits for land activities, such as spreading manure, spraying for crops or installing stream bank fencing. During the hearing, Nagle said the proposed rule could deter others from joining the ranks of agriculture.

"What if the ultimate effect of this rule prevents farmers from passing their operations on to their children, or prevents young people, like me, from becoming farmers?" Nagle said.

Opposition to the rule is gaining steam in Congress. So far, 231 members of the House of Representatives, including all Republican Congressmen from Pennsylvania, signed a letter to the EPA and Army Corps of Engineers asking them to withdraw the rule. The number in opposition is significant, as it takes 218 members of the House to approve a piece of legislation. Farm Bureau is continuing to interact with Congress and federal agencies to explain the harm this regulation could have on agriculture.

*From the **Penna. Agricultural Alliance Issues Update**, Penna. Farm Bureau, June 2014.*

### Crop Insurance Expansion Will Cover Specialty Crops

The 2014 Farm Bill now provides flexible crop insurance coverage for specialty crops, organic production and diversified crop operations under the new Whole-Farm Revenue Protection program.

Whole-Farm Revenue Protection insures every crop including specialty crops produced on the farm all at once instead of commodity by commodity. Agricultural producers engaged in fruit and vegetable production have not had access to crop insurance programs designed for high value commodities in the past but can now be confident that all crops will have coverage under the Whole-Farm program. The broader scope of the new crop insurance program may spur new expansion into fruit and vegetable production as part of a diversified cropping operation.

*(continued on page 8)*

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## NEWS

**National News Briefs** (continued from page 6)

Whole-Farm Revenue Protection will be available to producers beginning in 2015 with coverage levels from 50 to 85 percent. The USDA Risk Management Agency will release specific information on the Whole-Farm Revenue Protection program later this summer which will be posted on the RMA website at [www.rma.usda.gov](http://www.rma.usda.gov).

From the **Penna. Agricultural Alliance Issues Update**,  
Penna. Farm Bureau, June 2014.

**Proposed Rule for Designation of High Risk Foods**

The United Fresh Produce Association has submitted comments to the U.S. Food and Drug Administration (FDA) regarding the agency's proposed approach for designating foods as high-risk for the purpose of enhanced recordkeeping requirements. United's comments, based on broad and intensive discussion with member companies with expertise at each stage of the produce supply chain, addressed several points of concern:

High risk and the need for traceability are not connected. It is unnecessary for FDA to designate a food as "high risk" in order to require adequate and accurate recordkeeping to enable traceability.

No food is inherently high risk. As FDA describes in the preamble to its proposed Produce Safety rule, risk and the potential for contamination are more appropriately ascribed to handling practices rather than to the commodity itself.

Designation of a food as "high risk" can have serious consequences to public perception and confidence in the safety of the food.

United Fresh is concerned that a list of high risk commodities has the potential to be used for purposes other than to identify foods for which additional recordkeeping requirements are appropriate and necessary.

"We respectfully urge FDA to discontinue efforts to designate any commodities, by whatever classification system, as inherently high risk and, instead, focus on identifying commodities for which enhanced recordkeeping requirements are appropriate and necessary to protect the public health, even if that results in enhanced requirements for all foods," United said in the comments to FDA.

Read United's comments to FDA about this proposed rule <http://www.unitedfresh.org/assets/United%20Fresh%20co>

omments%20on%20proposed%20Designation%20of%20High%20Risk%20Foods.pdf. Learn more about the FSMA rulemaking process by visiting [UnitedFresh.org/FSMA](http://UnitedFresh.org/FSMA).

From **Inside United Fresh**, United Fresh Produce Association,  
May 29, 2014.

**Changes Proposed to the Harmonized Standards**

At their March 13 meeting at Taco Bell headquarters, the Produce GAPs Harmonization Initiative Technical Working Group approved five proposals for changes to the Post-harvest Operations Harmonized Food Safety Standards. Changes ranged from minor clarifications to inclusion of a new requirement regarding protection of produce from bodily fluids; the approved changes can be viewed at <http://www.unitedfresh.org/assets/Changes%20proposed%20to%20Post-harvest%20Harmonized%20Standards.pdf>.

"The first version of the Post-harvest Operations Harmonized Standards was finalized in June 2012," said Dr. David Gombas, senior vice president food safety and technology and coordinator for the Produce GAPs Harmonization Initiative. "These changes demonstrate our responsiveness to stakeholders, and also that the standards are otherwise complete and accepted by fresh produce packinghouses, coolers, distributors and their customers who are accepting audits performed to these standards." The changes will be open for comment for three months, until September 1, 2014. Unless there are substantive concerns, the changes will then become final.

At the same meeting, the Technical Working Group authorized a Documentation Task Force to review the Field Operations and Harvesting and the Post-harvest Operations Harmonized Standards, for which policies and procedures an operation should have written, versus being acceptable as just a verbal policy or procedure. According to Dr. Gombas, "When the Technical Working Group harmonized the various GAP standards into the Harmonized Standards, they were careful to require policies and procedures to be written only when necessary, relying on written records, inspection and employee interviews to demonstrate compliance with requirements. As a result, the Field Operations and Harvesting Harmonized Standards require only 27 policies and procedures to be written,

(continued on page 10)

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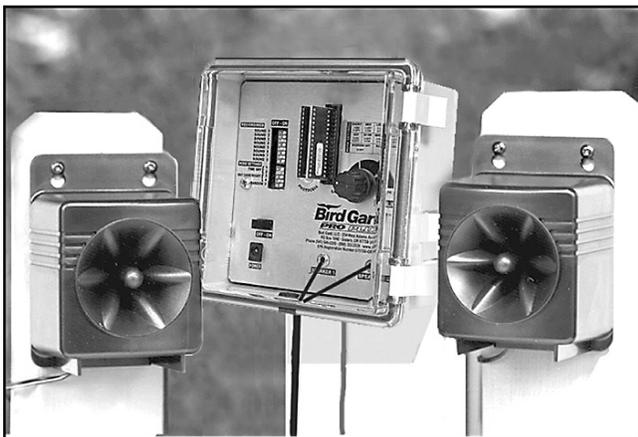


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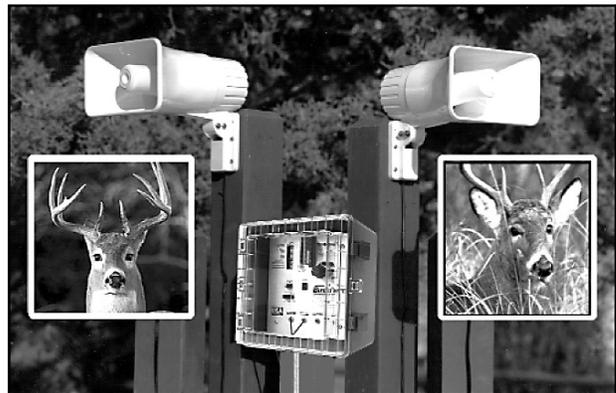


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NEWS

**National News Briefs** *(continued from page 8)*

and the Post-harvest Operations Harmonized Standards require only 24 to be written, many of which can be a few sentences combined in the operation's Food Safety Plan. Comments from stakeholders have caused the Technical Working Group to reconsider whether more documentation should be required." Anyone interested in participating on the Documentation Task Force should contact Erin Grether at [egrether@unitedfresh.org](mailto:egrether@unitedfresh.org).

*From Inside United Fresh, United Fresh Produce Association, June 5, 2014.*

**Pesticide Worker Protection Inspection Info Available**

Employers need to remember the requirements of the Environmental Protection Agency (EPA) Worker Protection Standards (WPS). Two outstanding farm employer resources on agricultural WPS compliance are:

1. EPA Ag Employer Quick Reference Guide (2005)
2. EPA website How to Comply with the Worker Protection Standard for Agricultural Pesticides: What Employers Need to Know at <http://www.epa.gov/agriculture/htc.html>.

**Farm Bureau Compiles Farm Bill Information**

The American Farm Bureau Federation has created a new website that will give producers information on new provisions of the 2014 Farm Bill.

The site includes videos and articles explaining the bill, including new risk management programs. Topics include the Price Loss Coverage and Supplemental Coverage Option, the Agriculture Risk Coverage Program and the Dairy Margin Protection Program.

"We have distilled down a massive and complex piece of legislation—the 2014 Farm Bill—into several 'bite-size' pieces, with the goal of helping farmers and managers understand how it will affect their farms," said John Anderson, deputy chief economist with AFBF.

Videos on the website cover specific commodity titles and will cover the decisions that farmers need to make in order to participate in particular programs. Farmers are encouraged to visit the site and watch the videos before the U.S. Department of Agriculture starts the sign-up for new programs.

"The website will be updated frequently to make sure that it's a one-stop shop for people to go and find information," Anderson said. "We hope that the website itself will kind of be a clearinghouse that people can refer to, to get a good set of sources on Farm Bill information."

Visit <http://goo.gl/ujjny> to learn more.

*From the Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2014.*

**Ozone Proven Effective to Clean Honeycombs**

Research by the USDA Agricultural Research Service recently discovered that fumigating bee honeycombs with ozone after honey removal can eliminate pests and pathogens that threaten honey bee health and may also reduce pesticide levels in hives.

Applied at various concentrations, ozone gas eliminates all the stages of the Greater Wax Moth, the Chalkbrood fungus and the American Foulbrood Bacterium which are all detrimental to bee colonies. Ozone was also proven to breakdown several classes of pesticides found in hives originating from treating parasitic mites or deposited by bees foraging plants that have been treated with a pesticide. The ozone treatment degraded pesticides better in new beehives than in older colonies.

Ozone may be applied to decontaminate combs from pests, pathogens and pesticides with commercially available equipment. Although the levels needed to treat honeycombs are toxic, ozone rapidly breaks down into water and oxygen.

*From the Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2014.*



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## NEWS

## State News Briefs

### Farm Vehicle Code Bill Moves Forward

A state House Committee has given approval to a bill that would exempt drivers of farm-registered trucks from federal commercial driver's license requirements.

House Bill 2092, introduced by Rep. Mark Keller, would apply to farm-registered trucks that are driven anywhere in Pennsylvania, or within a 150-mile radius of the farm when crossing state lines. That would make state law consistent with federal law.

House Bill 2092 was recently approved by the Transportation Committee and is now awaiting action by the full House.

The bill is part of a Pennsylvania Farm Bureau-led effort to make reforms to the state Vehicle Code.

Recently, the Senate passed a bill that would restore exemptions to registration-exempt farm trucks and drivers that were in place prior to 2010. Senate Bill 1301 is now facing action in the House.

Farm Bureau is also working with state lawmakers on a third bill that would exempt the transportation of products during harvest from the Vehicle Code's strict rules that prohibit any materials from escaping the vehicle as long as the load is not higher than the side of the truck, and the vehicle is kept at speeds below 45 mph.

*From the Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2014.*

### Masser, Huber Reelected to Penn State Trustees

Keith Masser and Betsy Huber have been reelected to another term to represent agriculture on the Penn State Board of Trustees.

Masser, of Schuylkill County, currently serves as chair of the Penn State Trustees. Huber, of Chester County, will be serving her fifth term on the board. Masser, a seventh-generation potato farmer is president and chief executive officer of both Keystone Potato Products LLC and Serman Masser. Masser is a 1973 Penn State graduate and a past PVGA and Penna. Farm Bureau board member.

During Masser's tenure with the family-run company, he has grown the business to more than \$50 million in sales. The company grows and processes potatoes for retail distribution.

Along with his Farm Bureau service, Masser has served on the National Potato Council, the United States Potato Board and the Pennsylvania Potato Research Advisory Board.

Huber, a past-president of the Pennsylvania State Grange, now serves as executive secretary of the Pennsylvania Young Farmers Association. Huber began her work with the Grange at the national level, serving as the organization's women's activities director. She also served as an office manager for the Pennsylvania State Grange and also worked as a legislative assistant to former state Rep. Arthur Hershey.

Five individuals and the Secretary of Agriculture represent agriculture on Penn State's Board of Trustees.

*From the Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2014.*

### French Food Company Opens Plant in Lancaster

A French food company specializing in processed fruits is opening its first U.S. operations in Lancaster County.

Charles & Alice Group, which sells kid-oriented products, plans on opening its 55,000-square foot plant in September.

The company expects to invest \$10.6 million in machinery and equipment, along with hiring 50 employees. The company is known in Europe as a leading applesauce manufacturer, including Fruit Pouches—portable fruit packets. Hess Brother's Fruit Company will supply fruit.

"We've been impressed by their energy and involvement in making this project happen," Thierry Goubault, CEO of the Charles & Alice Group, said of the involvement of state officials in helping the project reach completion. "We need a talented workforce, high quality apples, a supportive community and a business-friendly state governments, and we can find all of this here, in Pennsylvania."

*(continued on page 13)*





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## NEWS

**State News Briefs** (continued from page 12)

Charles & Alice has been exporting to U.S. markets since 2008.

*From the **Penna. Agricultural Alliance Issues Update**,  
Penna. Farm Bureau, June 2014.*

**A Century of Extension**

Land grant institutions across the country, including Penn State, are celebrating a century of Extension.

The Smith-Lever Act of 1914 established the Cooperative Extension Service, where state and county governments partnered with land grant colleges to provide research and scientific information with farmers across the country. The result has been numerous advancements in how food is grown in the country, and the application of the latest research techniques on farm fields.

As Extension heads into its second century, the system is undergoing changes to meet growing challenges. Extension is at a turning point, and the baby boomers who make up the largest portion of Extension's audience are leaving the workforce, said Dennis Calvin, director of Penn State Extension.

"Up to 60 percent of baby boomers could be retired in five to 10 years, and soon they'll be our past customers," he said. "We need to target the next generation of learners. In general, the way Generation X'ers and Millennials want to learn, access information and engage is far different from earlier generations."

Fewer people are also living in rural settings, and less than 2 percent of the country's population is directly involved with agriculture, Calvin said. Extension needs to adapt in order to meet that change, he said. Penn State Extension is looking at new services, including how-to videos, webinars and mobile apps, Calvin said.

*From the **Penna. Agricultural Alliance Issues Update**, Penna. Farm Bureau, June 2014.*

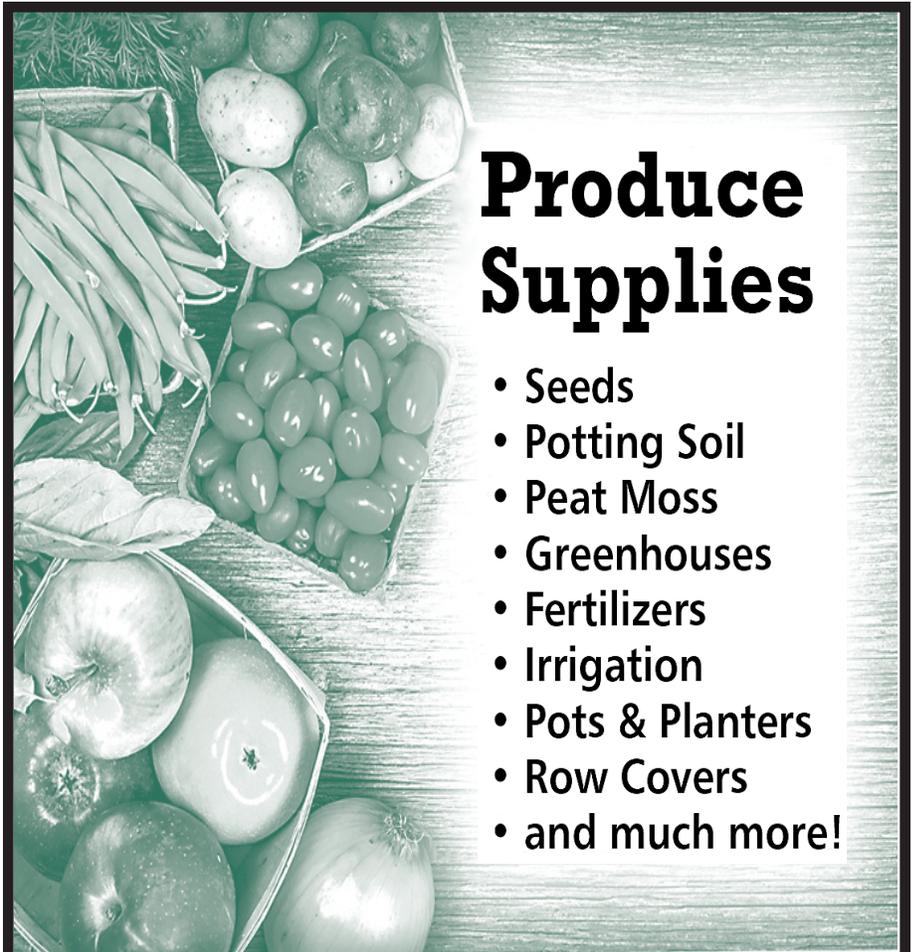
**Growing Greener and Other Grants Provide \$21 Million to Improve Water Quality**

Applications are now being accepted by the Penna. Department of Environmental Protection for Growing Greener Grants for watershed protection and abandoned mine projects.

A total of \$16 million is available through Growing Greener Grants, another \$3 million through the EPA and \$2 million from the federal Surface Mining Conservation and Reclamation Act will be available to local governments, schools, non-profits, municipal authorities and watershed authorities to improve water quality and address agricultural and urban runoff and the effects of acid mine drainage. The federal funds will be directed toward support of restoration efforts in 35 watersheds across Pennsylvania.

The state works with local organizations and federal agencies to prioritize watersheds in need of restoration. The environmental projects that improve water quality will generally need to be completed over a three-year period.

*From the **Penna. Agricultural Alliance Issues Update**,  
Penna. Farm Bureau, June 2014.*



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GENERAL

# Worker Protection Standards Apply to All Farm Workers

Susan B. Scheufele

The Worker Protection Standards (WPS) are federal regulations designed to reduce poisoning and injuries among agricultural workers and pesticide handlers. The WPS require that farm owners and employers provide protection to workers and handlers from potential pesticide exposure, train them about pesticide safety, and provide mitigations in case exposures may occur. These regulations apply to all farm workers, regardless of whether the farm uses restricted- or general-use pesticides, and all farms need to be in compliance with these laws. Luckily, the regulations are straightforward and relatively easy to implement.

“Restricted use” is a federal EPA designation that restricts a pesticide to use only by a certified pesticide applicator or under the direct supervision of a certified applicator. Only about 25% of all pesticides fall into this category with atrazine being the most common active ingredient in this category. Pennsylvania and most states require that farmers who want to apply restricted-use pesticides on their farms have a private certification for pesticide application.

Most pesticides fall into the “general use” category, including those listed by the Organic Materials Review Institute as allowed for use in organic systems. There is often a misconception that pesticides used in organic systems are safer and may be exempt from these regulations but this is not at all the case. As an example, copper formulations tend to have “warning” hazard labels as opposed to the lower “caution” label, as they can be fatal if swallowed and are eye irritants and therefore the REI is 48 hours and contaminated clothes must be washed before they are re-used. In Massachusetts\*, farmers who apply only general use pesticides are not required to be certified or licensed to apply pesticides, but they must be trained as EPA Worker Protection Standard (WPS) pesticide handlers. Handlers are defined as any farm workers who apply general-use pesticides and/or perform tasks such as mixing and loading pesticides, transferring or cleaning opened pesticide containers or spray equipment, or going into a treated area before the restricted entry interval (REI) has expired.

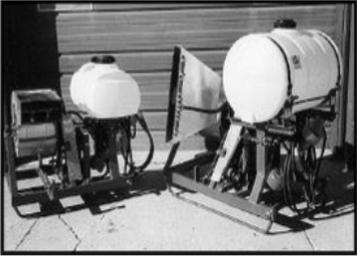
Farm employees who do not mix or apply pesticides and handle only unopened or decontaminated containers are considered workers and require WPS worker training.

Training. All workers and handlers must receive WPS training before they perform a pesticide related task, enter a treated area, or before they accumulate more than 5 separate days of entry into areas on your farm where a pesticide has

been applied or a restricted-entry interval has been in effect within the past 30 days. All workers and handlers must be trained at least every 5 years, however, there is legislation pending which would shorten the WPS training interval to one year. In order to provide worker training one must be an EPA certified handler or have completed a train-the-trainer program or be a certified pesticide applicator. To provide handler training one must be a certified pesticide applicator, be a state or federally designated trainer of certified applicators or handlers, or must have completed a train-the-trainer program. You can get training by becoming certified as a pesticide applicator.

The main components of WPS are: that all workers must undergo pesticide safety training that provides information on how and where pesticide injuries may occur and how to prevent

(continued on page 15)



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## GENERAL

**Worker Protection...**(continued from page 14)

them, product labels and spray records must be made available to workers at a central posting location where a pesticide safety poster and location of nearest medical facility are displayed, treated areas must have clear signage to keep people out until the REI has ended, decontamination materials (soap, water, and paper towels) must be available in the event of an accident, and access to emergency assistance must be provided. Below is a more specific list of WPS requirements:

- Pesticide safety training — for workers and handlers
- Access to labeling information — for pesticide handlers and early-entry workers including product labels and material safety data sheets (MSDS)
- Access to specific information — for workers and handlers, which includes providing information about when and where on the farm pesticide applications are made, emergency information, and a pesticide safety poster at a central location
- Keep workers out of areas being treated with pesticides
- Keep workers out of areas that are under a restricted-entry interval (REI), with a few narrow exceptions,
- Protect early-entry workers who are doing permitted tasks in pesticide-treated areas during an REI, including special instructions and duties related to correct use of personal protective equipment
- Notify workers about pesticide-treated areas so they can avoid inadvertent exposures
- Monitor handlers using highly toxic pesticides
- Provide required personal protective equipment to handlers
- Decontamination supplies — a sufficient supply of water, soap, and towels for routine washing and emergency decontamination, and
- Emergency assistance — making transportation available to a medical care facility in case of a pesticide injury or poisoning, and providing information about the pesticide(s) to which the person may have been exposed.

**WPS Farm Inspections.** All farms using restricted or general use pesticides may be subject to a pesticide inspection to ensure the WPS standards are being met. State agencies generally have primary jurisdiction for enforcing WPS misuse violations. Inspectors will usually be looking to see if your workers have had WPS training, if you have a WPS Central Information Display Area, and if you are following other requirements of the WPS regulations. If you are a certified pesticide applicator, you may also be asked to show your pesticide application records, storage and mixing areas.

*Ms. Scheufele is with the Univ. of Massachusetts Vegetable Extension. From Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Massachusetts Extension, Vol. 26, No. 8, June 5, 2014.*



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NEWS

# PA Preferred® Recognizes Member #863: Veg Out

Melissa Barrick's Veg Out shows that growing fresh products doesn't require a farm or owning acreage. Her operation, established earlier this year in State College, Centre County, specializes in fresh, healthy fruits and vegetables grown on eight rented plots of land.

"I'm not organic, but I try to be as healthy as possible," said Melissa about her growing philosophy. Education is key to happier, healthier customers.

"I want to introduce people to new foods because when people want to eat healthy, a lot end up eating a boring salad." Trying additional varieties and foods can make eating healthy more enjoyable. Buying local can also enhance the experience.

"I love the aspect of knowing where your food comes from and being able to talk to the farmer that grew it," said Melissa.

Currently, Veg Out's best sellers are lettuce and onions, but Melissa believes her nearly 50 varieties of tomatoes will be top of the heap when they ripen. Buy them and other products, like her 20 varieties of peppers or seven types of green beans, at the Lemont Farmer's Market Wednesdays from 2 to 6 p.m. in Lemont, Centre County, or in her hometown of Halifax, Dauphin County.



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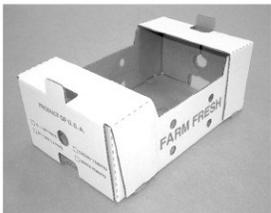
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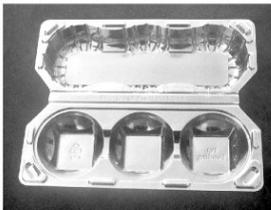
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## VEGETABLE PRODUCTION

## No-till, No-herbicide Planting of Spring Vegetables Using Low Residue Winter-killed Cover Crops

Tianna DuPont

Can we eliminate spring tillage, capture nutrients and prevent erosion with cover crops without compromising early spring vegetable yields? Maryland and Pennsylvania researchers and farmers recently trialed no-till planted spinach and other vegetables into winter killed radish and oat cover crops.



A MaterMacc seeder has no trouble planting into radish "residue." Photo credit: Dave Liker, Gorman Farm.

Ray Weil and Natalie Lounsbury's pioneering work with forage radishes at the University of Maryland could help growers reduce tillage and plant early. When planted in August, forage radishes suppress winter weeds and scavenge left-over nitrogen keeping nutrients out of groundwater. Succulent radish tissue melts away quickly when the ground thaws leaving dark soil to absorb spring warmth and little residue to interfere with planting equipment. Quickly decomposing radishes might also release nitrogen when early vegetables need it.

To test the feasibility of no-till planted early season vegetables Lounsbury and Weil compared oats, radish and radish oat cover crops on tilled and un-tilled seedbeds at the Clarksville research station in Maryland where they measured cover crop and tillage effects on soil water, temperature, N dynamics, potential planting date and crop responses for four different vegetable crops, focusing primarily on spinach. Along with Extension Educator collaborators they worked with eight farmers in Maryland and three farmers in Pennsylvania to trial no-till planting on real farms in real conditions.

Lounsbury found that no-till planting of early vegetables worked well in some cases and not in others. When forage radish was planted in mid-late August in Maryland and had adequate fall growth, spinach, pea and beet plantings were successful. In other cases, no-till planting was not feasible because heavy, lower organic matter soils tended to crust or become compacted over the winter. At other farms the field was too weedy after the winter killed radishes to attempt no-till. This may have been because radish cover crops were planted too late, did not have enough nutrients, or

were in wet soils. When radish cover crops are not grown in optimal conditions they do not create a dense canopy early enough in fall to shade out any fall germinating weeds. These weeds take off once the cover crop winter-kills.

It is not enough to be able to physically no-till plant the crop, yields and maturity have to measure up.

At an experiment site in Maryland's Piedmont region, no-till planted spinach after forage radish produced statistically equivalent yields to plantings after tilled in radish in one year, and out-yielded all other treatments in a second year. That is good news. In some conditions no-till spinach may be able to match up to spinach after tillage. However, results were site and farm specific, and no-till plantings did not yield well at a site on Maryland's Coastal Plain. Interestingly, some crops including kohlrabi and lettuce matured more slowly when planted into winter killed cover crop residue of radishes or oats when there was no tillage. This may be because the soil stayed colder. On farm, growers also realized it can be difficult to cultivate where there is radish residue.

This project was funded by Northeast SARE (LNE11-312). For the complete report, descriptions of on-farm case studies and tips for no till planting see the 2013 project report at [extension.psu.edu/vegetable-fruit/reports](http://extension.psu.edu/vegetable-fruit/reports). Research is continuing and updates can be found on the project's website and blog at [www.notillveggies.org](http://www.notillveggies.org).

Ms. DuPont is with Penn State Extension in Northampton Co. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension,

<http://extension.psu.edu/plants/vegetable-fruit/news/2014>,  
May 30, 2014.



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## VEGETABLE PRODUCTION

## Banking Potassium: Getting A Bit Ahead On Tomato Consumption

Steven Bogash

One of the greatest challenges in growing tomatoes in an intensive production system is keeping up with the plants high consumption of potassium during fruit production. Past recommendations have been based around beginning to increase potassium applications along with the first tissue test starting at the onset of flowering. This often results in our chasing potassium levels over 2 to 4 weeks in order to get them above 3% by dry matter. Very often some of the first fruit are yellow shouldered. The heavy consumption of potassium actually starts about 2 weeks before the first flowers are visible. The concept of 'banking' potassium or applying extra a bit earlier seems indicated in order to reduce packing house losses.

Before you start applying extra potassium, your irrigation / fertigation solution needs to be at the correct pH. Tomatoes and peppers extract the most nutrients at a pH of 6.2 to 6.5. For growers pulling irrigation water from limestone aquifers, this will probably mean the addition of acid on a constant basis to lower your water's pH. Get your water tested at a laboratory for pH and alkalinity expressed as ppm bicarbonate. Since the pH scale is logarithmic, each 1 point on the scale is a 10X difference in pH. A two point difference is 10 x 10 or 100X. This means that small variances from the ideal pH of 6.2-6.5 can result in major nutrient deficiencies. Most growers use either sulfuric acid or citric acid. Organic growers can use citric acid. Use the online alkalinity calculator at [http://extension.unh.edu/Agric/AGGHFL/alk\\_calc.cfm](http://extension.unh.edu/Agric/AGGHFL/alk_calc.cfm) to get your acid concentrations. Be sure to follow all directions on the calculator and pay careful attention to the pull down menus on the input side to get the correct recommendations.

Since we need to start the application of higher levels of potassium earlier than flowering in order to bank some and have high enough levels for the first fruit, tissue analysis should start as soon as your plants are large enough to collect full sized mature leaves from and not cripple your plants. Make the change to a higher potassium ratio fertilizer about 2 weeks prior to what you've been doing in the past and start a weekly foliar application of potassium at the same time. Be sure your fertilizer is compatible with foliar application.

Growing great tomatoes that are full flavored and have low losses in the packing house requires keeping tissue potassium levels above 3%. From before the first blossoms to the last harvest, tomato plants (and peppers as well) require huge amounts of potassium to produce the most flavor and prevent yellow shoulders / gray wall. Although I look at every nutrient level, those most important to packout are the following:

Tissue N levels should be at about 4% as fruit are developing. Higher levels can create soft fruit, more foliage, and fewer fruit.

Tissue K levels need to be above 3% for tomatoes and peppers to produce the highest quality fruit and to keep creating new blossoms.

Ideally Ca should be at about 3% and Mg at 0.8 to 1%. This prevents cracking and produces fruit that are tough enough for packing and shipping.

In retrospect, although I've always recommended bi-weekly tissue testing to growers due to the cost of the tests, I now recommend weekly sampling that starts as early as the plants can handle the cut.

If you plowed down 30 to 50% of your soil test recommended potassium, calcium and magnesium when getting your soil ready and work to keep these levels at their optimum values during production, you should be able to increase yields and reduce packing house losses.

*Mr. Bogash is with Penn State Extension in Cumberland Co. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension,*

*<http://extension.psu.edu/plants/vegetable-fruit/news/2014>,  
June 2, 2014.*

## New Supplemental Label for Presidio

Nathan Kleczewski

Presidio fungicide has a new supplemental label that was recently released. The rotational interval to corn has been reduced from 18 months to 30 days. The label can be accessed at the Field Crops Disease Management Blog: <http://extension.udel.edu/fieldcropdisease/2014/05/09/new-supplemental-label-for-presidio>.

*Dr. Kleczewski is an extension pathologist with the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware, <http://extension.udel.edu/weeklycropupdate/>, Vol. 22, Issue 7, May 9, 2014.*

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## Timber Rot on High Tunnel Tomatoes

Timothy Elkner

I have received calls recently from growers seeing timber rot in their high tunnel tomatoes. This spring often had ideal weather for the occurrence of this disease in a tunnel but the shift to warmer and drier weather has removed the chances for further infections of the disease. While the risk of infection is gone, now is the time to start your prevention program for next season.

Timber rot, which is also known as white mold or Sclerotinia rot,



*Timber rot on tomato stem*

has been a problem in tunnels periodically in the last few years. This disease has a wide host range and can survive in the soil for many years. Symptoms on tomato most commonly are the random collapse of entire plants as infections usually occur close to the soil line. However, when conditions are ideal (as was often the case this spring) any part of the plant can be infected including upper stems, leaf petioles, and even the fruit itself. Under conditions of high humidity a white mold will appear on the infected area; under drier conditions the affected area will turn a light tan color. Large black structures called sclerotia will develop in the infected areas, either inside or on the outside of the stem. These sclerotia can survive in the soil up to 10 years depending upon soil conditions.

The most important method for control of timber rot starts with sanitation after any infections occur. Remove and bury or destroy infected tissue before the sclerotia have a chance to fall to the soil. Since the spores that caused this disease most likely blew into the tunnel from nearby, sanitation around the outside of the tunnel is also important. There are a few fungicides labeled for control of timber rot but the problem is knowing when to apply these products. If you know that there may be sclerotia in your soil the most practical product to use next season is Contans which contains a microparasite that will attack the overwintering sclerotia. Contans needs to be applied 2 to 3 months before you plant your crop in order to be effective. Crop rotation, while practical in the field (switch to corn or a small grain) is not a likely control in a tunnel because of the wide host range of this disease. So it is critical that you reduce the chances of the disease overwintering in the tunnel in order to most successfully control timber rot next year.

*Dr. Elkner is with Penn State Extension in Lancaster Co. From the **Vegetable, Small Fruit and Mushroom Production***

*News, Penn State Extension,*

*<http://extension.psu.edu/plants/vegetable-fruit/news/2014>,*

*June 2, 2014.*

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VEGETABLE PRODUCTION

# More Black Cutworm Moths Than You Requested

John Tooker

It seems that black cutworm moths just keep coming. This season has been a big year for flights of black cutworm moths in Pennsylvania and other northern states; thus, it seems wise to recommend that corn growers should scout their fields for cutting damage in the coming weeks.

In the past week, we detected three more significant flights of black cutworm moths. These were discovered in Elk (near St. Marys), McKean (near Kane), and Potter (near Risser) Counties. Recall that Penn State's Black Cutworm Monitoring Network previously detected "significant flights" of black cutworm moths at four locations, near Kutztown (Berks County), near Montoursville (Lycoming County), near Pine Grove Mills, (Centre County) and Wysox (Bradford County). The flights mean that these parts of the state are at a higher risk than usual for black cutworm damage, but given the generally high flights, we recommend that growers across Pennsylvania be aware of the risk of damage.

The degree-day accumulations for these sites with significant flights are available on the PA-PIPE (see <http://extension.psu.edu/pa-pipe>) and are listed below as of the end of the day on 19 May. Given the pace of degree-day accumulations and warm weather being forecast, it seems we will be very close to 300 degree days toward the end of the week or beginning of next week. Moreover, given the extend period over which we have been detecting moths, it may be that the window for damage from black cutworm will persist for another few weeks. We realize that corn planting has been delayed in some areas and it may be that late emerging corn seedlings will be at

lower risk from black cutworm damage.

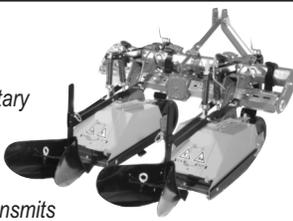
Recall that few Bt hybrids are that strong against black cutworm and insecticidal treatments do not protect well against this pest species. Scouting and rescue treatments are usually the most efficient and economical tactic for managing black cutworm. For more information, see our factsheet at <http://ento.psu.edu/extension/factsheets/black-cutworm>.

County	Date of Significant Flight	Degree Days Accumulated as of 19 May
Berks	28-Apr	190
Bradford	5-May	153
Centre	21-Apr	200
Elk	15-May	19
Lycoming	24-Apr	198
McKean	15-May	19
Potter	15-May	16

*Dr. Tooker is with the Department of Entomology at Penn State Univ. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, June 2, 2014.*



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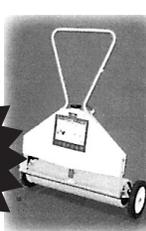
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# Watercress Production: Demand Increase Linked to “Super-food Status”

Thomas Ford

Watercress has always been considered a niche crop, but recent studies have elevated it to a “Super-food” status by many nutrition researchers. Research findings suggest that short-term and long-term watercress ingestion has potential antioxidant effects against exercise-induced DNA damage and lipid peroxidation (Fogarty MC, Hughes CM, Burke G, Brown JC, Davison GW. *Br J Nutr.* 2013 Jan 28; 109(2):293-301. doi: 10.1017/S0007114512000992. Epub 2012 Apr 5). Additional research documents the presence of anti-cancer fighting compounds in watercress which may target colon, breast, and certain oral cancers. The elevation of watercress to “Super-food” status has spurred an increase in the demand for this cruciferous herb in the marketplace.



Watercress displaying iron deficiency symptoms

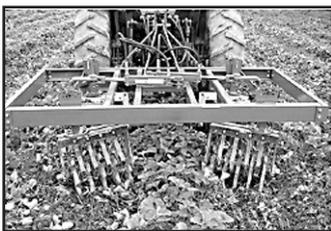
Watercress is often considered a minor specialty crop, but it can be a profitable enterprise for many growers in Pennsylvania. Watercress often grows wild in clear streams and springs and many rural residents have routinely augmented their family income each year by harvesting and selling “wild” watercress to area restaurants. While this has been a traditional practice and there have been no recent outbreaks of food borne illness from wild-harvested watercress, industry concerns regarding food safety have forced many restaurant/grocery buyers to seek out watercress grown under protected culture systems.

Watercress is considered to be an easy crop to raise or cultivate, but elevated solution pH can lead to nutritional deficiencies. One ounce of seed can produce up to 70,000 plants. For hydroponic production, seed should be sown into cubes containing rock wool or another inert media. Seed germination typically takes about 7-10 days under ideal conditions. Many growers sprinkle the watercress seed on rock wool cubes and then cover the cubes lightly with clear plastic to aid in moisture retention. Hydroponic systems for watercress often rely on the use of NFT channels made from PVC. Watercress is considered a relatively light feeder and many growers try to maintain a solution EC of 1.5 to 2.0 m/S with a pH between 5.0 and 7.0.

Watercress is first harvested about 6 to 10 weeks after sowing when new growth is about 6 to 8” long. Some growers harvest watercress on a weekly schedule for 3 to 4 weeks before

*(continued on page 24)*

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## VEGETABLE PRODUCTION

## New 'Tomato MD' App Helps Users Diagnose and Treat Sick Tomato Plants

Tomatoes are one of the most common garden crops in the U.S. But while popular, they are not always easy to treat when affected by plant diseases or bugs. With such a wide range of pests that affect tomato plants, gardeners at all levels—and even professional growers—can have a difficult time identifying and treating them.

Enter *Tomato MD*, (<https://itunes.apple.com/us/app/plant-health-from-aps/id868779103?ls=1&mt=8>) part of the new "Plant Health" family of apps for the iPhone or iPad. *Tomato MD* is an interactive reference that helps gardeners, professional growers, and consultants identify and manage more than 35 key diseases, insects, and physiological disorders of tomatoes.

*Tomato MD* is unique in that tomato experts have peer-reviewed all content to ensure the images and information are accurate. And while the information was reviewed by scientists, it is very accessible and published in an easy-to-use, non-scientific format.

Specific features of this app include:

- An index of more than 35 common diseases, insects, and mites that affect tomato plants. Once the disease or pest is isolated, users can learn more about causes and sources, symptoms, management strategies, other plants that may serve as host to the pest, and more useful information
- A peer-reviewed photo gallery of insects and mites and the specific damage they cause
- A diagnostic key of tomato diseases based on physical symptoms and the location of infection, including the leaves, stem, fruit, and whole plant
- A tutorial on packing diagnostic samples for the identification of diseases, insect and mite pests, and other disorders
- An updated list of U.S. diagnostic labs where samples can be sent
- Fully downloadable content. No internet or cellular connection is needed to operate the app once it is fully downloaded

*Tomato MD* was authored and peer-reviewed by members of the American Phytopathological Society, a nonprofit scientific organization dedicated to plant health. Among the contributors were members Margaret McGrath, Gail Ruhl, Michelle Grabowski, Daniel Gilrein, Robert Wick, and Margery Daughtrey.

## Watercress Production...

(continued from page 23)

replacing it with new stock. Data from New Zealand indicates that well managed hydroponic systems can yield between .30 to .41 pounds per square foot per month (over nine a nine month period). Direct marketers in the northeast are currently charging about \$15.60 a pound for "pesticide free" watercress which translates into a gross return of \$4.68 to \$6.40 per square foot of greenhouse space per month. Variations in hydroponic production systems and market demographics may impact the price that you may receive for your watercress while impacting your gross return per square foot. While there appears to be an increase in demand for hydroponically produced watercress, we do not know at this time if this will be a short term fad or a long term trend that growers can capitalize on. Growers wishing to produce watercress hydroponically should research their market carefully and consider locating potential buyers before investing in property, plant, or equipment.

*Mr. Ford is with Penn State Extension in Blair Co. From the Vegetable, Small Fruit and Mushroom Production News, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, May 30, 2014.*

*Tomato MD* is based in part on two APS PRESS Books: *Tomato Health Management*, (<http://www.apsnet.org/apsstore/shopapspress/Pages/44020.aspx>) Edited by R. Michael Davis, Ken Pernezny, and Janet C. Broome; and the *Compendium of Tomato Diseases and Pests, Second Edition* (<http://www.apsnet.org/apsstore/shopapspress/Pages/44242.aspx>) Edited by Jeffrey B. Jones, Thomas A. Zitter, M. Timur Momol, and Sally A. Miller.

Users can sample *Tomato MD* via the APS Plant Health app. The entire *Tomato MD* app can be purchased at the introductory rate of just \$1.99. Users can also find the app by searching "Tomato MD" or "Plant Health" in their iPhone or iPad's App Store.

## Tomato Disease Management

*Kate Everts*

As for all crops, good disease management principles should be used for tomato diseases. These practices include field rotation with nonrelated crops, site selection, and the use of organic amendments such as cover crops to improve soil quality. Extensive research shows that a hairy vetch cover crop will help suppress disease development on tomato. Use raised beds and use trickle irrigation if possible to avoid excessive leaf wetness. Staking plants also aids in air movement around plants. Select cultivars with tolerance or resistance to disease when possible, and heat treat seed to manage bacterial diseases.

A good fungicide program should begin when plants are 6 inches tall, with protectant products. An early season conventional program for disease protection includes products such as mancozeb + copper applied twice and then alternated with mancozeb + a strobilurin product (Cabrio, Quadris or Priaxor). If bacterial spot or speck have been problems in the past, Actigard can be added at a low rate (0.33 oz/A) on alternate weeks for better control.

Once harvest is close, be especially careful of products that have a long PHI (pre-harvest interval). During harvest products such as Endura + chlorothalonil could be rotated with Quadris Top. Recent tomato trials from around our region have shown that several new products have good efficacy on tomato diseases and can be incorporated into programs. Priaxor looked good on Septoria, Fontelis and Quadris Top looked good on early blight.

Be sure to scout for specific diseases such as timber rot. If this disease is a recurring problem in your fields, make sure to keep Endura in your program. It is a good material for early blight and also has efficacy on timber rot. You also should consider use of Contans to drive down the inoculum in your field (though it is most effective when applied 3 – 4 months in advance of disease).

The disease late blight has also been a problem in Delaware and Maryland in recent years. You can anticipate its occurrence by monitoring the USABlight website (<http://www.usablight.org/>) throughout the growing season. There are many good fungicides for managing late blight (see the Pennsylvania Commercial Vegetable Production Recommendations). Revus Top and Tanos have efficacy on both late blight and early blight.

*Dr. Everts is the extension vegetable pathologist specialist with the Univ. of Delaware and the Univ. of Maryland. From the Weekly Crop Update, Univ. of Delaware, <http://extension.udel.edu/weeklycropupdate>, Vol. 22, Issue 8, May 16, 2014.*

## Fungicide Resistance Management for Cucurbit Diseases

M.B. Dicklow

The list of diseases affecting cucurbit crops is long and varied. Some information about the life cycle and resistance profiles of the organisms causing these diseases can guide an effective control strategy. While there is some overlap in the effectiveness of certain materials against the suite of diseases affecting cucurbit crops, there are many cases where the most effective treatment for one disease will be completely ineffective against others. For this reason proper identification of the pathogen is critical for effective control.

Some of these pathogens are developing resistance to fungicides that had given good control for years, but are now almost completely ineffective. Two of the most damaging pathogens of cucurbits in New England, Powdery Mildew (*Podosphaera xanthii*) and Downy Mildew (*Pseudooperonospora cubensis*), are capable of rapidly developing resistance to selective fungicides. Chemical control of these diseases must include a rotational program using both broad-spectrum and selective materials in order to preserve the efficacy of these materials for the long term.

Powdery Mildew (*Podosphaera xanthii*) infections result in fewer fruit and/or fruit of low quality (poor flavor, sunscald, poor storability). The action threshold for starting fungicide applications is one leaf with symptoms out of 50 older leaves examined. Examine both surfaces of leaves. Starting treatment after this point will compromise control and promotes resistance development. An important component of fungicide programs is using materials which can move to the lower leaf surface (systemic or translaminar) because powdery mildew affects both

leaf surfaces. Systemic fungicides, due to their single site mode of action, are prone to resistance development in pathogen populations.

Powdery mildew fungi have demonstrated the ability to develop resistance to these classes of fungicides: benzimidazoles (FRAC Group 1), demethylation inhibitors (FRAC Group 3), and strobilurins (FRAC group 11). Avoid using these products in your rotation. Under low disease pressure however, demethylation inhibitors (FRAC Group 3) may be used at the highest labelled rate effectively since they exert a more gradual selection pressure on the organism, as opposed to the high selection pressure exerted by FRAC group 1 and 11 materials.

Quintec (quinoxifen, FRAC Group 13) (not registered on cucumbers or summer squash) should be used early in the disease cycle then alternated with Torino (cyflufenamid, FRAC Group U6), Procure (triflumizole, FRAC Group 3) or Rally (myclobutanil, FRAC Group 3) plus Bravo (chlorothalonil, FRAC Group M5), or Inspire Super (difenoconazole plus cyprodinil, FRAC Groups 3 & 9). Torino is a new fungicide with a new mode of action that has performed well in research trials. Its activity is limited to Powdery mildew. Fontelis (penhopyrad) and the Luna (fluopyram) (watermelon only) series are new fungicides in FRAC Group 7 which also includes Endura (boscalid). Strains of the pathogen resistant to boscalid have been detected and there is high cross resistance within Group 7 members. Therefore, Luna and Fontelis should only be used once and in rotation with the more effective chemicals listed above.

(continued on page 26)

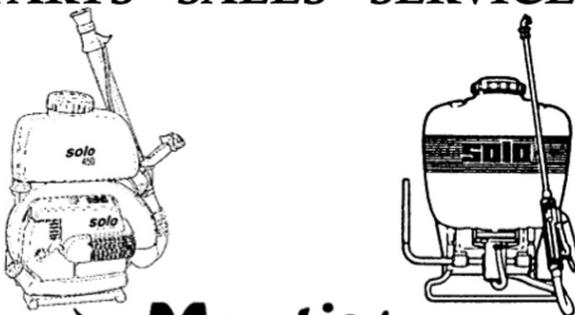
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VEGETABLE PRODUCTION

Fungicide Resistance Management...(continued from page 25)

2013 Fungicide Resistance Management Guidelines for Cucurbit Downy Mildew and Powdery Mildew Control in the Mid-Atlantic & Northeast regions of the United States							
Fungicide	Active Ingredient(s)	FRAC Code*	Risk Rating**	REI / PHI***	Powdery Mildew	Downy Mildew	General Fungicide Resistance Management Guidelines****
Kocide 3000 or OLF	fixed copper(s)	M1	L	48hr/0days	+		FRAC code M fungicides are low risk, protectant fungicides. Use alone, or tank mix with high-risk fungicides to improve control
Microthiol or OLF	sulfur	M2	L	24hr/	++		
Manzate, Dithane or OLF	EBDC	M3	L	24hr/		++	
Bravo, Echo or OLF	chlorothalonil	M5	L	24hr/	++	++	
Topsin M	thiophanate methyl	1	H <sup>R</sup>	24hr/	+		Always read product labels before use
Rally	myclobutanil	3	M <sup>R</sup>	12hr/0days	++		
Procure	triflumizole	3	M <sup>R</sup>	12hr/0days	++		Select fungicides with at least ++ rating. Rotate among fungicides with different FRAC codes. Tank mix high risk fungicides with FRAC code M product if the product is not formulated with a FRAC code M fungicide.
Folicur	tebuconazole	3	M	12hr/0days	++		
Inspire Super	difencconazole + cyprodinil	3 + 9	H	12hr/7days	++		
Ridomil Gold Copper	mefenoxam + copper	4 + M1	H <sup>R</sup> + L	48hr/5days		+	
Ridomil Gold Bravo	mefenoxam + chlorothalonil	4 + M5	H <sup>R</sup> + L	48hr/0days		+	
Fontelis	penthiopyrad	7	M - H	12hr/1day	++		
Luna Experience <sup>a</sup>	fluopyram + tebuconazole	7 + 3	M	12hr/	+++		
Luna Sensation <sup>a</sup>	fluopyram + trifloxystrobin	7 + 11	M	12hr/	+++		
Pristine	boscalid + pyraclostrobin	7 + 11	H <sup>R</sup>	12hr/0days	++	+	
Quadris	azoxystrobin	11	H <sup>R</sup>	4hr/1day	+	+	
Cabrio	pyraclostrobin	11	H <sup>R</sup>	12hr/0days	+	+	When resistance is qualitative (FRAC code 1 and 11 fungicides), resistant pathogen strains are completely insensitive and cannot be controlled with the fungicide.
Flint	trifloxystrobin	11	H <sup>R</sup>	12hr/	+		
Reason	fenamidone	11	H	12hr/		+	
Tanos	famoxadone + cymoxanil	11 + 27	L - M	12hr/3days		+	
Quintec	quinoxifen	13	H	12hr/3days	++++		
Ranman	cyazofamid	21	M - H	12hr/0days		+++	
Gavel	zoxamide + mancozeb	22 + M3	M + L	48hr/5days		++	
Curzate	cymoxanil	27	L - M	12hr/3days		++	
Previcur Flex	propamocarb HCL	28	L - M	12hr/2days		+++	
Alliete	aluminum tris	33	L	12hr/12hr		+	
Phosphonates	phosphorous acid salts	33	L	4hr/		+	With quantitative resistance (FRAC Code 3 fungicides), pathogen strains exhibit range in fungicide sensitive and efficacy depends on level of insensitivity. Better control can be obtained with high label rates and tight spray intervals.
Forum	dimethomorph	40	L - M	12hr/		+++	
Revus <sup>b</sup>	mandipropamid	40	L - M	12hr/0days		+ / +++	
Presidio <sup>b</sup>	fluopicolide	43	H	12hr/2days		+ / ++++	
Zampro	ametoctradin + dimethomorph	45 + 40	M	12hr/0days		++++	
Torino	cyflufenamid	U6	M	4hr/0days	++++		

Efficacy Ratings: + = poor (not recommended), ++ = poor to good, +++ = good, ++++ = very good, +++++ = excellent

\* FRAC code: M = multi-site mode of action (MOA), numbered groups = fungicides with similar MOA

\*\* Risk Ratings: L = low risk, M = moderate risk or H = high risk for fungicide resistance to develop

\*\*\* Restricted Entry Interval / Pre-Harvest Interval

\*\*\*\* See fungicide label for specific crops, rates and instructions on use

<sup>a</sup> = resistance known; (+) control failures detected in the mid-Atlantic and Northeast regions

Fungicides with the same color belong to the same FRAC code

Trade or Brand Names Disclaimer: The trade or brand names given herein are supplied with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension is implied. Furthermore, in some instances the same compound may be sold under different names, which may vary as to label clearances. Andy Wyenandt (Rutgers); Meg McGrath (Cornell); Beth Gugino (Penn State); Kate Everts (Univ. MD); Steve Rideout (VA Tech); Nathan Kleczewski (Univ. DE)

**VEGETABLE PRODUCTION**

**Fungicide Resistance Management...***(continued from page 26)*

Organic materials OMRI listed for control of Powdery mildew do not have a single-site mode of action and so are not likely to select for resistant pathogen strains. These materials include oil (mineral and botanical types, eg JMS Stylet-oil, GC-3 Organic fungicide, Organocide), sulfur (Microthiol Dispers), and copper (e.g. Champ WG). These materials have been found to work well in some studies. Please note that copper and sulfur products can cause phytotoxicity in some cucurbit crops, and do not apply sulfur when temperatures exceed 90° F, as plant injury may occur.

Downy Mildew does not affect fruit directly, but infected leaves die prematurely which results in fewer fruit and/or fruit of low quality. An important resource for determining when to switch from broad spectrum protectant fungicides to the oomycete-specific materials is the NCSU Cucurbit Downy Mildew Forecasting (CDM ipmPIPE) website.

Presidio (fluopicolide, FRAC group 43) has been the most effective fungicide until recently indicating that resistance may have developed. Presidio should be used judiciously with limited applications in a good rotation program and always mixed with a protectant fungicide. Zampro (ametoctradin plus dimethomorph, FRAC Groups 40 & 45) is a new fungicide with good activity against Downy mildew. Other effective materials include Previcur Flex (propamocarb HCl, FRAC group 28), Gavel (zoxamide plus mancozeb, FRAC Groups 22 & M3) (not pumpkin or winter squash), Ranman (cyazofamid, FRAC Group 21) plus

protectant, and Tanos (famoxadone plus cymoxanil, FRAC Groups 11 & 27) plus protectant.

These systemic materials should be applied only once before rotating to another fungicide in the list above. Both Presidio and Previcure Flex are also effective against late blight on tomatoes and downy mildews on a host of other vegetable crops.

Organic control options for Downy mildew in cucurbits are limited. Copper products are probably the most effective material available to organic growers, but may cause phytotoxicity in some cucurbit crops. Resistance is unlikely to develop towards copper fungicides since they have a complex mode of action and exert low selective pressure. There are also numerous biological and biorational materials labeled for organic production, though their efficacy may be more variable. Check with your certifier for information about which formulations are currently approved for organic production.

**Fungicide Resistance Management:** Apply targeted fungicides tank-mixed with protectant, broad-spectrum fungicides weekly and alternate among available chemistries based on FRAC code. Add new fungicides to the program when they become available; substitute new for older product if they are in the same FRAC group.

- Do not make sequential applications of high risk (systemic) fungicides within the same FRAC group.

- Alternate or tank mix systemic (high risk, single site mode of action) fungicides with protectant fungicides (low risk, multi-site mode of action). Contact fungicides FRAC codes are designated Mx. Common protectant fungicides include copper, chlorothalonil, mancozeb, or sulfur.

*(continued on page 28)*

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## VEGETABLE PRODUCTION

## Watch for Potato Leafhopper in Potato, Eggplant, Beans

Ruth Hazzard

Potato leafhoppers (PLH) have been observed in part of New England. It is likely their arrival in potato, eggplant and bean crops will continue to spread, and scouting is warranted. It is important to protect plants when leafhoppers first arrive, before nymphs build up.

**Identification.** Adults are about 1/4 inch long, light yellow-green, and fly up from foliage when it is disturbed or shaken. These are the first arrivals. PLH overwinters in the southern US and moves north annually. Nymphs will be found later on the underside of leaves, light green, wedge-shaped and very fast-moving.

**Damage.** Adults and nymphs feed by inserting a needle-like beak into the plant and sucking out sap. They also inject a toxin into the plant, which causes yellowing, browning, and curling of leaves. In potato, leaf margins turn brown and brittle first, followed by death of entire leaves, a condition known as 'hopperburn.' In eggplant, leaf margins and tips turn yellow and curl up. Feeding can reduce yield before damage is visible. Damage can be severe on early-season and red varieties of potato, as well as in green beans, eggplant and raspberries. Long-season cultivars tend to be more tolerant. Beans are more susceptible when they are young than at later stages. Field crops such as alfalfa, clover, soybean, sunflower and tobacco are also hosts.

**Scouting and thresholds.** It is difficult to count adults since they fly quickly when foliage is shaken or disturbed. Sweep nets can be used to detect adults – treat if more than 1 adult is found per sweep. If you see one adult per plant when you shake the foliage, you are likely in that range. Once nymphs develop, they can be monitored by visually inspecting lower leaf surfaces on lower leaves. Treat if more than 15 nymphs are found per 50 leaves. Use a threshold of 1.5 leafhopper per leaf in eggplant.

**Synthetic insecticides.** In potato and eggplant, some materials registered for Colorado potato beetle adults will also control leafhopper, including neonic foliar sprays such as Provado or Assail. These and several other carbamate, synthetic pyrethroid and organophosphate products are also registered for leafhopper in potato, eggplant and snap beans. Refer to the New England Vegetable Management Guide for registered products. While the classes of insecticides listed above generally have high toxicity to bees, there are variations within classes; for example, Assail (acetameprid) has a lower toxicity to bees (rated as Medium) while most neonics are rated as High.

**Organic insecticides.** Pyrethrin (PyGanic EC5.0) has been shown to be the most effective product for reducing leafhopper numbers and damage. Good coverage is important. The residual period is short. Spraying late in the day or in the evening may provide better control than spraying early in the morning. Don't wait for numbers to build up. Row cover can be used to delay PLH infestation in snap beans until flowering, when plants are less susceptible to damage. Using row cover is recommended on young eggplant, as it protects from flea beetles, CPB and PLH.

**Pollinators and other beneficials.** Although bees do not forage extensively in beans or potatoes, they may be active in the field when these crops or the weeds within the crop fields are flowering. During that time, selection of products with lower toxicity to bees is advised. Look for toxicity information on the label,

(continued on page 29)

## Fungicide Resistance Management...

(continued from page 27)

- Systemic chemicals can be alternated among FRAC groups, preferably in tank mixes with the protectant fungicides listed above, and in accordance with label requirements. Make sure that different trade names are not members of the same active ingredient class; resistance to one member of a FRAC group most often results resistance to all other members.

- Apply the most effective fungicide first and then rotate with registered fungicides with a different mode of action.

- Do not make applications of systemic fungicides when disease is already widespread as this encourages resistance development in the existing large pathogens populations.

**Cultural Practices:** Resistance management and fungicide use are not the only effective measures of control for other cucurbit diseases, therefore, consider these cultural practices to avoid disease issues in the future:

- Plant disease resistant cultivars. Select powdery mildew resistant or tolerant seed varieties of squash, pumpkin or muskmelon and downy mildew resistant cucumber.

- Disease-free seed: Always buy seed from a reputable source as Angular Leaf Spot and Scab (*Cladosporium cucumerinum*) are commonly introduced via contaminated seed.

- Rotate fields out of cucurbits for 3 years to avoid Black Rot (*Didymella byroniae*, also called Gummy stem blight), Angular leaf spot, Bacterial wilt, or *Plectosporium* blight and 4 years or more to avoid *Phytophthora capsici*. Field rotation is not an effective control option for powdery mildew or downy mildew because these pathogens are airborne and infect fields yearly.

- Insect Management: Focus on Striped cucumber beetle management to avoid the spread of bacterial wilt.

- Get proper diagnosis of symptoms if the preventative measures you have taken have failed by submitting samples to the Penn State Plant Disease Clinic (see <http://plantpath.psu.edu/facilities/plant-disease-clinic> or contact your county Penn State Extension office).

Further reading regarding other cucurbit diseases:

Cucurbit Disease Management Strategies for 2013 (T. A. Zitter, Cornell University – see <http://www.hort.cornell.edu/expo/proceedings/2013/Vine%20Crops/Vine%20Crops%20Zitter%20Disease%20Management.pdf>)

Cucurbit Disease Scouting and Management Guide (UMass Extension – see <https://extension.umass.edu/vegetable/publications/cucurbit-disease-scouting-management-guide>):

Updated by M.B. Dicklow, Univ. of Massachusetts Extension, with credit to A. Cavanagh & Katie Campbell-Nelson, Univ. of Massachusetts Extension and M. McGrath (Cornell Univ.), T. A. Zitter (Cornell Univ.), Andy Wyenandt (Rutgers Univ.), Beth Gugino (Penn State Univ.), Kate Everts (Univ. of Maryland), Steve Rideout (Virginia Tech, and Nathan Kleczewski (Univ. of Delaware). From **Vegetable Notes for Vegetable Farmers in Massachusetts**, Univ. of Massachusetts Extension, Vol. 26, No. 6, May 15, 2014.

VEGETABLE PRODUCTION

**Watch for Potato...***(continued from page 28)*

and also in the New England Vegetable Guide (Table 26, and in the products listed for each crop & pest). For conservation of both native pollinators and honeybees, control weeds in the crop and avoid drift onto flowering borders or crops. However, encouraging some flowering areas in the margins is good for supporting pollinators before and after crops bloom. These can also be a nursery and refuge for beneficial predators and parasites of insect pests. Unfortunately they may also harbor tarnished plant bug which feeds on emerging leaves and flower buds in a very wide range of plants.

*Ms. Hazzard is the Univ. of Massachusetts Extension. From Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Massachusetts Extension, Vol. 26, No. 9, June 12, 2014.*

**The Concept of a Rain Shelter**

*Gordon Johnson*

There has been increased interest in high tunnels for season extension. However, one of the important roles that a high tunnel has is to serve as a rain shelter.

Rain shelters are often used in high rainfall areas to produce sensitive crops such as tomatoes and other fruits which are susceptible to cracking. Some fruits crack from absorbing water through the skin of the fruit when they are ripe or near ripe, others crack with excess water in the root zone, and there can be a combination of the two processes. Rain shelters control both of these causes for fruit cracking.

Rain shelters also reduce foliar wetting and rain splash and therefore can reduce fungal and bacterial diseases considerably.

While a high tunnel will serve as a rain shelter, less expensive structures can also be used that have a plastic cover and open sides and ends.

Rain shelters have been shown to improve the quality of tomatoes throughout the growing season and can be a valuable tool to increased marketable fruits of high quality. They are also useful for fruit crops such as cherries and blueberries.

*Dr. Johnson is the extension vegetable and fruit specialist with the Univ. of Delaware. From the Weekly Crop Update, Univ. of Delaware, <http://extension.udel.edu/weeklycropupdate/>, Vol. 22, Issue 6, May 2, 2014.*

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## BERRY PRODUCTION

## Fungicide Resistance in Strawberries

Kathleen Demchak

Botrytis or gray mold is a major disease for strawberry growers, and there is some new information on fungicide resistance that growers should have.

I'd like to thank Dr. Guido Schnabel, Clemson University, for his input and work, as what he and his colleagues are doing is very helpful to growers everywhere. This information is summarized from work being conducted in the southeastern U.S. - at the Univ. of Florida and Clemson Univ. - where researchers have been testing botrytis isolates from strawberry fields for resistance to commonly-used fungicides. They tested over 1800 samples from 183 farms in 2012 and 2013, and found the following:

More than 75% of the isolates tested were resistant to thiophanate-methyl (Topsin M). Resistance to this material is not a big surprise, as this is an older material that was known to be at high risk for resistance development.

Roughly half of the isolates tested in each year were resistant to pyraclostrobin (the active ingredient in Cabrio, and one of the active ingredients in Pristine), though a smaller percentage (29% and 5% in 2012 and 2013, respectively) were resistant to boscalid, the other active ingredient in Pristine.

Resistance to both thiophanate-methyl and pyraclostrobin were found in essentially every location in both years, though not in all samples, meaning that resistant isolates existed on nearly every farm.

In 2012 and 2013, respectively, 29 and 17% of isolates were resistant to cyprodinil, which is one of the active ingredients in Switch, with very low levels of resistance to fludioxinil, the other active ingredient in Switch.

About 1/4 of botrytis isolates were resistant to fenhexamid (the active ingredient in Elevate).

And, of extreme interest...

More than half of the isolates were resistant to fungicides in more than one chemical class. 33% of the isolates were resistant to fungicides in either three or four different chemical classes.

This cannot be dismissed as purely a problem in other states - Dr. Schnabel has done limited testing in MD and PA, with the help of Bob Rouse, and found significant resistance in those samples, too.

The first question some folks might have is whether you could buy plants infected with resistant isolates. Nurseries are very aware of potential resistance issues, and are generally very careful about fungicide rotations - after all, they have a lot at stake if they can't control diseases. Also, some materials that are at high risk of resistance development are prohibited from nursery use. So I'm more concerned about use on individual farms. Every now and then, I talk to someone who thinks they are rotating fungicides, but then when asked which ones they use, lists the names of 2 or 3 products with ingredients in the same fungicide class. I also know that when you have small acreages, it's tempting to buy one or two products at a time, and use those until they are gone, rather than accumulate products in your pesticide shed. So, those practices are a concern.



Please read on for what you can do to help.

First, be sure to use any cultural controls that you can to avoid disease issues, cut down on botrytis inoculum on your farm, and minimize the need for sprays. Every spray avoided is avoidance of an opportunity for resistance development. Cultural controls consist of removing dead leaves from plasticulture fields in the spring (that's where a lot of inoculum overwinters), and basically, anything that helps the field to stay dry, because diseases need moisture to sporulate. So, keep weeds controlled, rows narrowed back, and possibly consider a wider row spacing in matted-row production, or slightly wider plant spacing on plasticulture beds. Keep fields picked to the greatest extent that you can, and encourage harvesters to remove rotten fruit from the field. Cultural controls generally have other benefits like improving plant growth and fruit quality.

Second, don't just spray on a schedule - spray only when you have a reason. Even if you don't see botrytis, inoculum is out there, and every spray exposes what inoculum is there to the material you are using. This applies to any crop - not just strawberries. If the weather is dry and no rain is forecast, there is probably no reason to spray, at least not for diseases.

Third, consider a break from any at-risk fungicides that you have used more commonly in the past. Dr. Schnabel mentioned that resistance development has not progressed on farms where growers moved to other products and then were careful about how they used them.

Fourth, either rotate at-risk products with a broad-spectrum fungicide like captan (0-day PHI but 24-hr REI) or thiram (3-day PHI and 24-hr REI), or include them in a tank mix. You may have seen last month's article about concern with captan use during bloom and bees, but by now, you should be past bloom, and so for any disease issues for the remainder of the year, you should be able to use broad-spectrum materials, IF you need to spray.

Finally, be sure to consult FRAC codes on the fungicide package, or Table 6.14 in the Mid-Atlantic Berry guide for information on the fungicides that fall under different chemical classes.

### References:

- Fernandez-Ortuno, D., A. Grabke, P. K. Bryson, A. Amiri, N. A. Peres, and G. Schnabel. 2014. Fungicide Resistance Profiles in Botrytis cinerea from Strawberries Fields of Seven Southern U.S. States. Plant Disease 98(6):825-833. Online at <http://dx.doi.org/10.1094/PDIS-09-13-0970-RE> with access limited. A summary of the work can be found here: <http://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-09-13-0970-RE?journalCode=pdis>

*Ms. Demchak is with the Department of Plant Science at Penn State Univ. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, June 2, 2014.*

## GREENHOUSE PRODUCTION

## Flower Trial Field Day Set for July 31

The annual Penn State Flower Trial Field Day on Thursday, July 31, 2014, is your opportunity to see first-hand over 1,100 of the newest annual flowers that will be offered to garden center and landscape clients next spring. Guided tours by our flower evaluators are featured events. Speakers will present topics on disease management and greenhouse efficiency.

The field day will be held at Penn State's Southeast Agricultural Research and Extension Center, 1446 Auction Road in Manheim (Landisville) from 7:30 a.m. to 4:30 p.m.

The schedule for the day is as follows:

- 7:30 Registration
- 8:00 Welcome and Opening Remarks
- 8:30 Tour of Trial Gardens
- 11:00 Recent Disease Outbreaks on Annuals and Perennials –  
Dr. Gary Moorman, Penn State Univ.
- 12:00 Lunch
- 1:00 Maximizing Spring Production Space – Michael Goyette,  
Pleasant View Gardens, New Hampshire
- 2:00 Heating with Woodchips/Biomass Instead of Oil/Gas –  
John Albright, Total Energy Solutions, LLC



3:00 Tour of Trial Gardens

There will be a silent auction during the morning and a fundraiser during lunch to raise money for the trial garden endowment fund.

The cost is \$45 for reservations made by July 17 or \$55 after July 17. To register call 717-270-4391 or visit <http://extension.psu.edu/plants/green-industry/events>. For additional information, contact Sinclair Adam at 717-270-4391 or [saa19@psu.edu](mailto:saa19@psu.edu). Pesticide credits will be available for licensed applicators for Delaware, Maryland, New Jersey, and Pennsylvania.

## NEWS

**Don't Miss These PVGA...**

(continued from page 2)

Another event being offered by Penn State Extension but not sponsored by PVGA is:

August 12, 2014

**New Grower Cut Flower School**

Ever want to diversify your production or start a cut flower business? Attendees of this workshop will have the opportunity to learn about starting a cut flower operation from Kate Sparks, owner of Lilies and Lavender. We will also discuss weed, disease and pest management strategies with Steve Bogash, Extension Educator.

The objective of this course is to introduce farmers to growing cut flowers and observe and discuss different management strategies. Farmers interested in starting a cut flower operation or wanting to learn different management techniques should attend. We will take a tour of Lilies and Lavender cut flower farm, discuss plant selection for beginning growers, harvest and post-harvest handling, and weed, disease and pest management.

The school will be held at Lilies and Lavender Farm, 729 Limekiln Road in Doylestown, from 3:00 to 6:00 p.m. There is a \$25 registration fee. To register see <http://extension.psu.edu/plants/vegetable-fruit/events> or call 610-743-1970. For further information contact Andrew Puglia at [ajp5168@psu.edu](mailto:ajp5168@psu.edu) or 610-743-1970.

## CLASSIFIEDS

**Equipment**

**FOR SALE – WALK-IN FREEZER** – 15 ft. x 18 ft. x 10 ft. with refrigeration unit.

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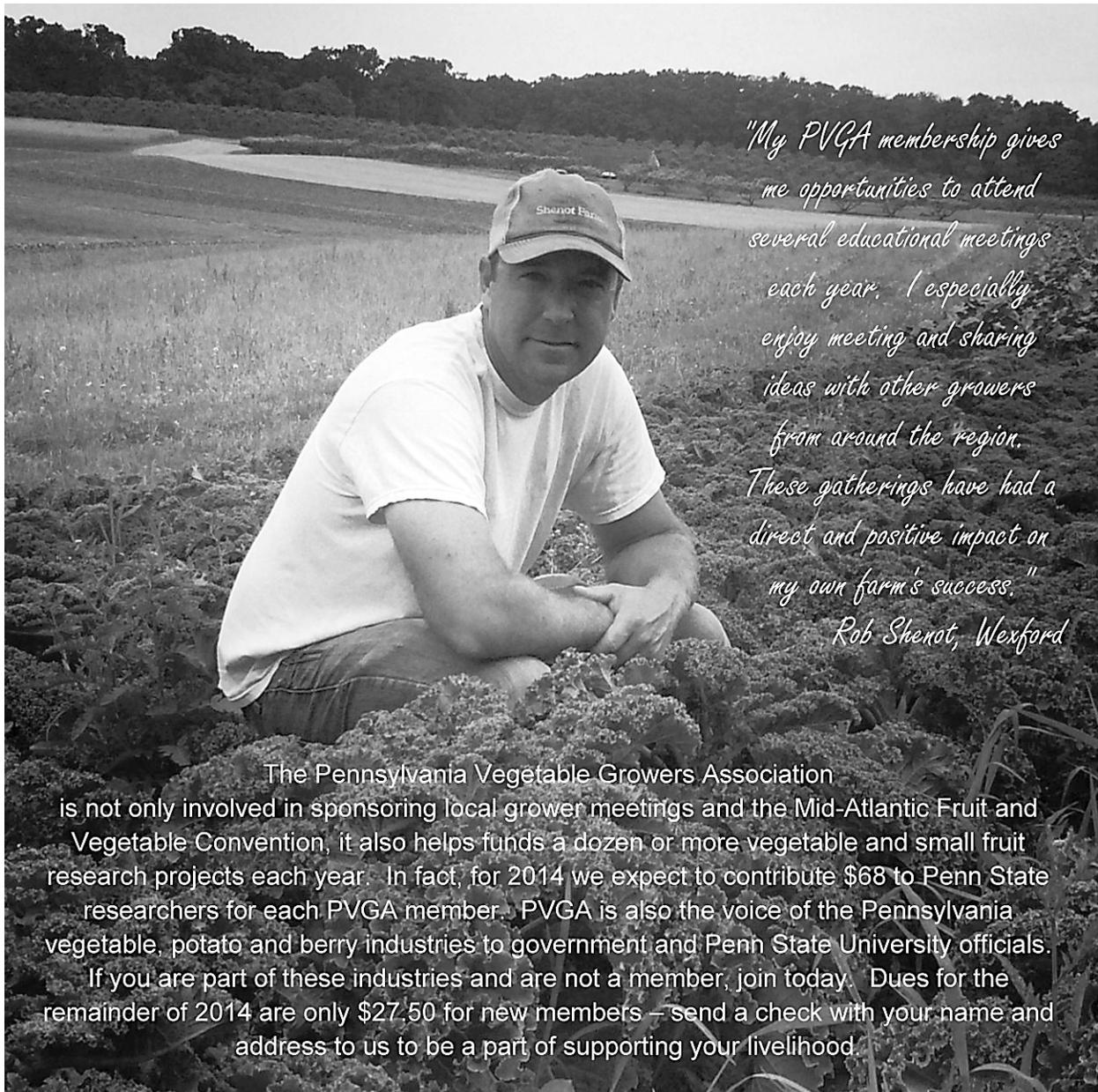
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**Pennsylvania Vegetable Growers Association**

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*"My PVGA membership gives me opportunities to attend several educational meetings each year. I especially enjoy meeting and sharing ideas with other growers from around the region. These gatherings have had a direct and positive impact on my own farm's success."*

*Rob Shenot, Wexford*

The Pennsylvania Vegetable Growers Association is not only involved in sponsoring local grower meetings and the Mid-Atlantic Fruit and Vegetable Convention, it also helps fund a dozen or more vegetable and small fruit research projects each year. In fact, for 2014 we expect to contribute \$68 to Penn State researchers for each PVGA member. PVGA is also the voice of the Pennsylvania vegetable, potato and berry industries to government and Penn State University officials. If you are part of these industries and are not a member, join today. Dues for the remainder of 2014 are only \$27.50 for new members – send a check with your name and address to us to be a part of supporting your livelihood.

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