

## 2015 PVGA Field Day Set for August 5 at Landisville

The 2015 Pennsylvania Vegetable Field Day will be held on Wednesday, August 5, 2015, at Penn State's Southeast Research and Extension Center in Manheim (Landisville) from 9:00 a.m. to 2:00 p.m.

Registration will begin at 8:30 a.m. and growers will be able to visit the commercial exhibitors until the program begins. At 9:00 a tour of the vegetable research trials will begin. After lunch, the vegetable research tour and discussion will continue until 2:00 p.m. Those that want to may do a self-guided tour of the flower trials beginning at 2:00 p.m. or talk with the researchers. Growers attending the field day will be eligible for pesticide applicator update training credits.

The field day enables growers to observe firsthand the various vegetable research projects underway at the research farm – much of it sponsored in part by the Association and the Pennsylvania Vegetable Marketing and Research Program. Extension educators Steven Bogash, Tanner Delvalle, and Timothy Elkner and as well as Beth Gugino and other researchers have numerous projects underway at the farm. Exhibitors may be providing equipment demonstrations also.

Projects this year include:

- Watermelon Variety Trial
- High Tunnel Determinate Tomato Variety Trial (If we can find any leaf mold, we will be inoculating as well.)
- Burpee High Tunnel Variety Trial
- Broccoli Variety Trial

- New Formulation Regalia Pepper Bacterial Spot Trial
- Tomato Insect Management Trial
- Foliar Nutrition of Tomatoes in high tunnel trial
- Russet Potato Variety Trial
- Celery Variety Trial

There will be a tasting of tomato varieties and possibly watermelon varieties.

The registration fee for the Field Day is \$20 for adults (\$10 for children 3 to 10, children under 3 are free) if registered by July 31. After July 31, the late registration fee will be \$30 for adults (\$15 for children). Registration includes a delicious barbecue chicken buffet lunch by Enck's Catering, program materials, drinks and snacks. Use the form on page 30 to register.

The Southeast Ag Research & Extension Center at Landisville is located at 1446 Auction Road, Manheim, PA 17541 - telephone 717-653-4728. Directions are as follows:

FROM HARRISBURG: Take PA 283 east toward Lancaster. Exit at Esbshade Road (just past Mt. Joy exit). Turn left at top of exit ramp. Immediately after crossing over 283, turn right on Auction Road. Follow Auction Road to "T" at Erisman Road. Turn right and follow Erisman Road around the curve. Then turn left, back onto Auction Road (just before the covered bridge). The PSU driveway is on the left as you go around the curve.

*(continued on page 2)*

## Don't Miss These Summer Educational Events

Various groups are sponsoring different educational events this summer that can be valuable learning and networking opportunities for growers. Many are sponsored partially by PVGA 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.

July 7, 2015

### Urban Homesteading: Bug Your Bugs – July Pest and Pathogen Pest Walk

This workshop will be held from 6:00 to 8:00 p.m. at the Edible Teaching Garden, 400 North Lexington Street, Pittsburgh, PA 15208.

The Bug Your Bugs workshop is part one of a two part urban twilight meeting sequence. In this workshop, community members will take an interactive walk led by an Extension edu-

cator, Sandy Feather, through the Penn State Master Gardener Edible Teaching Garden. Attendees will learn to identify common pests in the area that may be affecting home gardens or crops by observing those insects found while on the walking tour. The instructor will also be informing on responsible and safe ways to alleviate or eliminate the different types of pests identified for this part of the growing season.

Registration is \$25 which includes light refreshments. To register, go to <https://www.cvent.com/events/urban-home-steadying-bug-your-bugs/registration-839ad96a46c7431a8cd3a6ab863f6a2f.aspx> or contact Rachel Samuels: [ras1024@psu.edu](mailto:ras1024@psu.edu), 412-482-3464. Registration deadline is July 3.

July 14, 2015

### Central Susquehanna Summer Vegetable Meeting

This twilight meeting will take place from 6:00 to 8:30 p.m. at the Carl Wenger Farm, 1148 Old Trail Road, Liverpool, PA 17045.

*(continued on page 8)*

## NEWS



**Pennsylvania  
Vegetable Growers  
Association**

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

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## In Memory

### Francis (Sonny) Janoski

Francis (Sonny) Janoski, grower and former PVGA Director, passed away on June 6 at the age of 78. He and his wife Jo Ann founded Janoski's Farm and Greenhouses. A native of Mount Lebanon where the Janoski family had grown vegetables since 1890, Sonny moved to Clinton when he and Joann were married in 1962 to begin their own operation. They developed the farm business over the years, incorporating in 2000 as Janoski Farms, Inc., to include 35 greenhouses, a retail farm market, a bakery, a garden center, and a country restaurant besides 200-acres of vegetable production. October features their Pumpkinland agritainment for the entire family. The farm's staff includes eight family members and thirty seasonal employees.

Besides PVGA, Sonny was a member of the Green Star Co-Op, Pennsylvania Farm Bureau, and the Pennsylvania Flowers Growers Association. He was also President of the Allegheny County Fruit and Vegetable Association. His funeral was held at St. Columbkille Roman Catholic Church in Imperial where he was a member.

He survived by his wife of 52 years, Jo Ann; three children and their spouses: Deborah and Tim Seibel of Clinton, Michael and Patty Janoski of Clinton and Diane and Ken Swimkosky of Robinson Township; 13 grandchildren and one great-grandson. His son Daniel passed away in 2011.

*Information from the Pittsburgh Post-Gazette, June 8, 2015 and www.janoskis.com.*

### M. Everett Weiser

Everett Weiser, grower and father of PVGA Director Timothy Weiser, passed away on May 18 at the age of 90 at his home in York Springs.

After graduating from York Springs High School he entered the Army and served in the 553rd Military Police Escort Guard during World War II. After the war, he started working on a local fruit farm owned by Norman Starry – a farm he and wife Olive purchased after several years, renaming it Weiser Orchards. They opened a farm market and moved it to its present location just off US Route 15 in 1963.

Everett was elected to the Knouse Foods Board of Directors in 1960 and served for 41 years. A Mid-Atlantic Master Farmer, he was also involved in Mountain Orchards, CCNB/PNC Bank, the National Cherry Board, Adams County Fruit Growers Association, the State Horticultural Association of Pennsylvania, Hebron Masonic Lodge and the York Springs Fire Co. He helped form the John Conrad Weiser Family Association and served as its president for many years. His funeral was held at Holy Trinity Lutheran Church in York Springs.

He is survived by his wife of 71 years, Olive, four sons, Mark, Conrad (Martha), Timothy (Carol) and Steven, six grandchildren, nine great-children and three sisters.

*Information from the Pennsylvania Fruit News, State Horticultural Association of Pennsylvania, Vol. 95, No. 4, May 2015.*

## 2015 PVGA Field Day... (continued from page 1)

FROM LANCASTER: Take PA 283 west toward Harrisburg. Exit at Salunga exit (after the Landisville exit). Turn right at top of ramp, onto Spooky Nook Road. Turn left on Shenck Road (at the old Armstrong warehouse). Turn left across the covered bridge, then turn right on Auction Road. The PSU driveway is on the left as you go around the curve.

FROM YORK: Take US 30 east toward Lancaster. After crossing the Susquehanna River, take second exit (Prospect Road). Turn left on Prospect Road and follow for several miles. About ? mile after crossing over PA 283 (4-lane highway), turn left on Shenck Road (at old Armstrong warehouse). Turn left across the covered bridge, then turn right on Auction Road. The PSU driveway is on the left as you go around the curve.

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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.*

## National News Briefs

### Flawed Water Rule Finalized

The Environmental Protection Agency and the U.S. Army Corps of Engineers approved their deeply flawed “waters of the U.S.” (WOTUS) rule, which significantly expands federal authority under the Clean Water Act. The move comes months after receiving thousands of comments from farmers and state and local governments expressing grave concern over the rule. Now, miles of small creeks, streams, ditches and dry land could fall under federal jurisdiction—land features that were previously subject to state and local oversight. Farm Bureau is reviewing the WOTUS rule, but has little comfort that either agency addressed farmers’ significant concerns about the rule.

“The process used to produce this rule was flawed. The EPA’s proposal transgressed clear legal boundaries set for it by Congress and the Courts and dealt more with regulating land use than protecting our nation’s valuable water resources,” said American Farm Bureau Federation President Bob Stallman. “EPA’s decision to mount an aggressive advocacy campaign during the comment period has tainted what should have been an open and thoughtful deliberative process.”

Farm Bureau is also working with members on Congress on legislation that would thwart the agencies’ ability to enforce the rule. Recently, the House of Representatives passed the Regulatory Integrity Protection Act, sponsored by Rep. Bill Shuster, which would prevent the WOTUS rule from moving forward. The Senate is also considering similar legislation. A *Senate committee has approved a bill that definitively defines what waters of the US the EPA and Army Corp can regulate and orders them to draft a new rule with input from farmers and other stakeholders.*

*From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.*

### House Votes to Repeal COOL

Bob Gray

By a resounding vote of 300 to 131, the U.S. House of Representatives voted to repeal the Country of Origin Labeling (COOL) Act which was part of the 2002 Farm Bill. The repeal action by the House was in response to a World Trade Organization (WTO) ruling made May 26 which found that U.S. labelling requirements for beef, pork and poultry products was out of compliance with free trade commitments with Canada and Mexico.

The two countries are seeking retaliatory actions against U.S. food and other products at a combined \$3.7 billion per year. The value of the exact amount of retaliatory actions Canada and Mexico can take are being worked out with the WTO.

Nevertheless, these retaliatory actions could take place by late summer or early fall.

Over the next few months Congress must pass legislation to “fix” the problem and have full acceptance by Canada and Mexico. In 2014 the U.S. bought more than 2 million head of cattle from Canada and Mexico and about 5 million hogs from Canada.

Both Canada and Mexico have contended that the meat labeling rules put their meat at a disadvantage since U.S. meat packers had to segregate animals that were domestic or grown in Canada or Mexico in order to have a “produced in the USA” label on the meat. As a result, U.S. meat packers offered lower prices for beef cattle and hogs from Canada or Mexico. The two

countries have won all four appeals they have made to the WTO and now the way has been cleared for them to retaliate on a variety of U.S. food products, including dairy. In addition other goods such as jewelry that are exported to Canada would be on the retaliatory hit list.

*Mr. Gray works with the Northeast Dairy Farmers Cooperatives. From the NDFC Newsletter, Northeast Dairy Farmers Cooperatives, June 12, 2015.*

### Passage of Trade Promotion Authority

Agriculture Secretary Tom Vilsack released the following statement regarding Senate passage of Trade Promotion Authority legislation:

“Today the Senate helped move America closer to securing responsible agreements that open markets for America’s farmers, ranchers and agribusiness and create jobs and improve wages across the country. Over 70 organizations representing America’s farmers and ranchers, and past secretaries of agriculture in both parties dating back to the Carter Administration all support trade promotion authority because export sales are vital for U.S. agriculture. Last year, agricultural exports totaled more than \$150 billion and for many of our products, foreign markets represent half or more of total sales. Those exports supported approximately 1 million U.S. jobs last year. The economy is strengthened and better paying jobs are created in rural America and communities throughout the country by the additional economic activity that flows from expanded farm and food businesses.

“Standing still is not an option. Our farmers and ranchers face exorbitant tariffs and others barriers in important foreign markets, and if we do not act to maintain and gain market share in these places, our competitors will. U.S. agriculture’s interests are best served by ensuring America is at the table with strong negotiating authority.

*From USDA.*

### Four Seasons’ Ron Carkoski Named Produce Man of the Year

The Packer has named Ron Carkoski, president and CEO of Four Seasons Produce in Ephrata and the outgoing chairman of the United Fresh Produce Association, its Produce Man of the Year.

Greg Johnson, editor of The Packer, noted that during Carkoski’s tenure as president at Four Seasons, the company has grown ten-fold. They have established three new business units: Earth Source Trading Co. that imports produce, Sunrise Logistics that provides a distribution network and Sunrise Transport that operates the refrigerated truck fleet.

As chairman of the United Fresh Produce Association for the last year, Carkoski helped expand the Association’s school salad bar program, improve its food safety services and start a partnership with the National Association of Convenience Stores.

One of his industry peers noted that Carkoski “is a perfect example of someone whose secret to success is by giving – to his peers, colleagues, employees, friends and family. He lives his life, both professionally and personally, according to the old proverb ‘give and you shall receive’”.

*From The Packer at [www.thepacker.com/news](http://www.thepacker.com/news), June 9, 2015.*

## NEWS

## State News Briefs

### Property Tax Reform Takes Significant Step Forward

Attempts to reform how school districts fund public education won a significant victory this month as the Pennsylvania House of Representatives voted for a measure to reduce property taxes. House members voted 109 to 86 in a bipartisan show of support to shift some of the school funding burden away from property taxes and instead use a mixture of personal income and sales tax. The bill now heads to the Senate for consideration.

House members supported a provision, introduced by Rep. Stan Saylor, a York County Republican, which calls for a dollar-for-dollar shift in property taxes with other funding sources. The provision was attached as an amendment to House Bill 504, which calls for an increase in sales tax exemption for timber operations.

Pennsylvania Farm Bureau supported both the Saylor amendment and House Bill 504. PFB President Rick Ebert thanked lawmakers for addressing property tax reform, an issue that our organization has supported for decades.

"The legislation is a fair and equitable way to finance Pennsylvania's public schools, because every dollar raised by increases in personal income taxes and the state sales tax would be used to provide property tax relief for landowners," said PFB President Rick Ebert.

House Bill 504 will bring \$5 billion for property tax relief, or a 20-30 percent reduction in taxes depending on the school district, according to lawmakers. To achieve the reduction, the bill calls for increasing personal income taxes to 3.7 percent from its current 3.07 percent and increasing sales taxes to 7 percent from 6 percent. Current sales tax exemptions would remain. Personal income taxes would be used to reduce school district millage rates while sales taxes would be put to the homestead/farmstead exemptions. Saylor said the legislation has a built in mechanism to curtail future property tax increases.

The issue of property taxes came into sharper focus this spring when Gov. Tom Wolf made reducing property taxes a foundation of his budget proposal. Gov. Wolf's plan contains several key differences compared to the legislation passed by the House, chief among them that his plan would not address open land but only offer relief for homesteads and farmsteads.

Saylor, along with fellow Republicans from York and Adams County, said there was not sufficient support in the General Assembly for the total elimination of property taxes, but property owners could not afford further inaction.

"At present, the votes do not exist to completely eliminate school property taxes. Doing nothing threatens to do more harm than good," the lawmakers said in a joint statement. "Pennsylvania is now 26 Senate votes and one governor's signature away from doing what has never been done before."

Pennsylvania Farm Bureau continues to support and advocate for the total elimination of property taxes. Farmers, many of whom are the largest taxpayers in a given school district, pay a disproportionate share of taxes, because they need land to sustain their operations. That's why House Bill 504 is a good step forward, Ebert said.

"The tax shift element of the bill is critically important to farmers, who face significant property tax bills because owning large amounts of land is necessary to having a viable farm operation, even though land ownership does not reflect wealth," he said.

Pennsylvania Farm Bureau has created a new website detailing information about the property tax reform at [www.pfb.com/propertytaxreform](http://www.pfb.com/propertytaxreform). At the site, visits can find information supplied by the House Finance Committee on how taxpayers in each school district might benefit from the property tax relief proposed in the House bill.

*From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.*

### Senators Pass Pension Reform Plan

The Pennsylvania Senate has passed a pension plan that will plug a growing shortfall in the system by shifting new employees to a 401k-style system and changing a formula for current workers. Senate Bill 1, introduced by Senate Majority Leader Jake Corman, passed the Republican controlled Senate, 28 to 19 on a vote that fell mostly on party lines. The bill now heads to the House for consideration. Pennsylvania Farm Bureau praised Senators for addressing the state's growing pension issue.

"Action needs to be taken quickly to stop the ballooning state pension deficit from growing further out of control," said PFB President Rick Ebert. "We support Senate Bill 1, because it includes provisions to address both short-term and long-term problems associated with the pension programs."

Pennsylvania's two public pension systems—one for school district and the other for state government employees—is underfunded by at least \$53 billion due to poor market performance and prior legislative action. SB 1 would seek to close the state's pension gap by moving new employees from a defined benefit plan to a defined contribution plan, and requiring employees to contribute 3 percent of earnings into a cash balance plan. All members of the Pennsylvania General Assembly, upon election or reelection, would be enrolled in a defined contribution plan.

Under the bill, current employee contributions would be increased to 3 percent for school district employees and to 2.5 percent for state government employees. If employees decided not to increase their contributions, their benefits would be rolled back to pre-2001 levels, when the General Assembly modified the pension plan for employees. The bill also calls for the creation of a public pension commission, comprised of investment professionals and retirement advisors to make recommendations on the performance of current investment strategies.

*From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.*

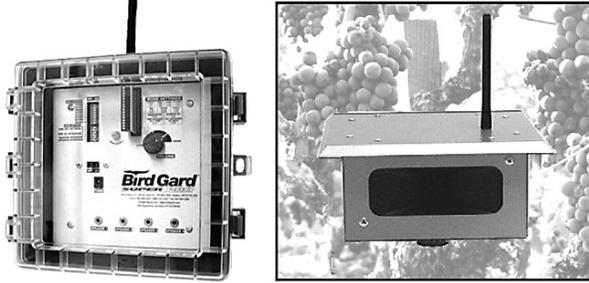
### Two More PFB Supported Bills Gain Traction in General Assembly

Two bills supported by Pennsylvania Farm Bureau are advancing in front of the General Assembly. One bill will make local income tax filings uniform for farm families, while the other addresses the installation of commercial wind operations on preserved farmland.

Senate Bill 356, introduced by Sen. Mike Folmer, will make the filing of local income taxes consistent with state laws. Local income tax laws do not have many of the same rules for farmers as state and federal income tax laws. Federal and state income tax laws allow for simplified reporting and payment of taxes. Folmer's bill would give farmers the option of making a single filing and payment of estimated taxes, instead of quarter-

*(continued on page 6)*

## New Bird Gard with Wireless Speakers



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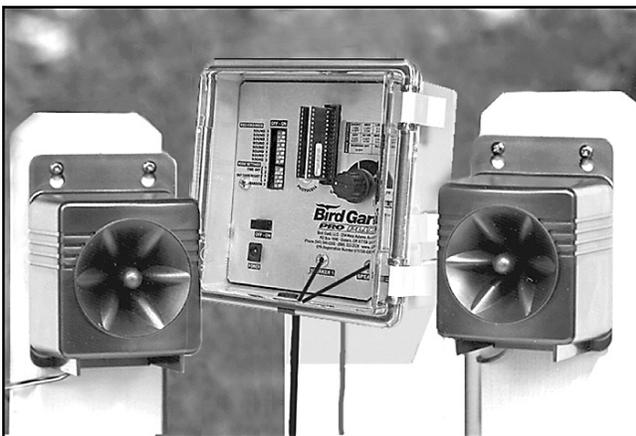


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## NEWS

**State News Briefs** (continued from page 4)

ly filings, and allow for "safe harbor" provisions for payment of estimated taxes, based on income from the prior year. It would also make local tax law deadlines similar to state and federal deadlines. Folmer's bill recently passed the Senate Finance Committee and is facing action by the full Senate.

House Bill 188, introduced by Rep. Curtis Sonney, would allow for the development of wind energy projects on land previously preserved or under conservation easement. The bill would set limits on the amount of preserved land that could be used for wind energy development. The bill was approved by the House of Representatives and is now facing action by the full Senate.

From **Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.**

**Farmers Can Still Receive State Sales Tax Exemption Without EIN Number**

Pennsylvania Farm Bureau recently received clarification from the Pennsylvania Department of Revenue on whether a farmer must obtain and use a federal Employer Identification Number (EIN) to be exempt from state sales tax on purchases of farm supplies and equipment.

Farmers must present a completed Pennsylvania Exemption Certificate (REV-1220) or have one on file with the seller in order to be exempt from sales tax on farm purchases.

However, recent versions of the form ask for an EIN, leading some sellers to believe the farmer must provide a taxpayer number, like an EIN or Social Security number, in order for the farmer's purchase to be exempt from sales tax.

According to Department of Revenue officials, the farmer is not required to have an EIN to qualify for the farming exemption. And the farmer without an EIN is not required to provide a Social Security number in place of the EIN on the form. Farmers without EINs need only check Box No. 1 of the form, write "farming" in the blank space on that line on the form, and write "N/A" in the space where the EIN would be indicated. If a farm has an EIN, farm owners or employees must provide that number on the form. A version of the REV-1220 form that allows you to complete the form with your computer can be found at the Department's website, [www.revenue.pa.gov](http://www.revenue.pa.gov). Click on FORMS AND PUBLICATIONS, then Sales, Use and Occupancy Tax to get to the web page where the link to the REV-1220 form appears.

From **Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.**

**PFB Offers Cautious Support for Hemp Legislation**

Pennsylvania Farm Bureau offered cautious support for legislation that would provide for the limited use and growing of industrial hemp in Pennsylvania. Lawmakers are currently considering legislation that would create a pilot program for growing industrial hemp. The 2014 Farm Bill allowed states to develop industrial hemp programs.

Testifying before a joint session of the House and Senate Agriculture & Rural Affairs Committee, John Bell, PFB's government affairs counsel, said farmers could see a benefit from

growing hemp. However, there are a number of practical and legal concerns that could impact farm families.

One issue that farmers will face is the lack of an integrated and nationwide strategy for products using hemp, and how to handle and market the product for consumers, Bell said. It's also not known the full extent of consumer demand for hemp products, he said.

There are also concerns about the legal and practical consequences that farmers and others producing and marketing hemp in Pennsylvania may face in the wake of federal drug laws. "Federal law essentially treats all cannabis plants, including plants that can only be useful for hemp products, as illegal substances," said John Bell, PFB's government affairs counsel. "The Farm Bill provides only a very limited exception, and doesn't clearly spell out what persons must do or may not do to be legally protected from federal enforcement actions."

Therefore, anyone growing or marketing hemp under Pennsylvania's program are not absolutely guaranteed immunity from enforcement, prosecution and seizure of property as contraband, Bell said.

Pennsylvania Farm Bureau encourages you to move forward in enacting enabling legislation that will allow Pennsylvania to engage in production and marketing of hemp and hemp products," Bell said. "But we also ask that you remain vigilant in ensuring the application and enforcement of ambiguities in federal statutes are not used abusively or arbitrarily against persons acting in good faith to comply with law while participating in production and marketing of hemp in the commonwealth."

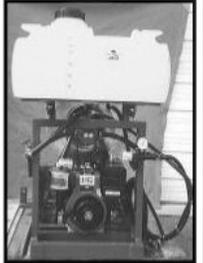
Farm Bureau also supports changes in federal drug laws to eliminate treatment of plants used for industrial hemp production as an illegal substance.

From **Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.**

(continued on page 7)









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

**Pennsylvania Farm Bureau Opposes Attempts to Downsize the General Assembly**

The House of Representatives passed two bills that would call for significant reductions in the Pennsylvania General Assembly—a move opposed by Pennsylvania Farm Bureau. Both pieces of legislation would need approval from two consecutive sessions of the General Assembly and then approved by voters during a ballot referendum. Prior to the vote, PFB urged members of the House to vote against the legislation, saying the move would disenfranchise rural voters.

“Reduction in the number of legislative districts will have the practical effect of further eroding opportunities for access of rural constituents with their elected representatives and for the representatives to conduct and advocate for the special needs of rural Pennsylvania,” PFB said.

HB 153, introduced by Rep. Jerry Knowles, would reduce the number of house seats to 151 from its current 203. If approved, each state representative would represent 84,500 residents. Currently, House members represent 62,000 residents. HB 384, introduced by Rep. Fred Keller, would reduce the size of the state Senate to 37 districts from its current level of 50. If both bills are approved, the reduction would not take effect until the first legislative session after the 2020 reapportionment. Every 10 years, the boundaries of General Assembly districts are redrawn based on changes in population. Both bills head to the Senate for consideration.

*From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.*

**PVGA Member Wins National Award**

Two Adams County farmers, including PVGA member Timothy Brown, received national recognition for their efforts with farmland preservation. Brown and Tom Clowney were presented with the Local Hero Award by the American Farmland Trust and the Pennsylvania Farmland Preservation Association. Both are charter members of the Adams County Agricultural Land Preservation Board. The award is given to individuals who have made substantial contributions to farmland preservation efforts in Pennsylvania. Clowney and Brown have led efforts to preserve 164 farms, totaling 25,500 acres of farmland in Pennsylvania.

“Their 25-year record is extraordinary,” said Jim Baird, Mid-Atlantic Director for the American Farmland Trust. “Both are dedicated volunteers and passionate about protecting the one irreplaceable resource we need to grow food — our farmland.”

Brown operates a diversified farm outside Littlestown. They produce grains and also operate a retail market for fruits and vegetables. Brown has been a member of the county’s preservation board since its inception and now serves as chairman. The farm was preserved in 2001. Clowney owns a dairy farm outside Gettysburg. He was the first chairman of the Adams County Agriculture Land Preservation Board and he and his wife Joanne preserved their farm in 1992.

*From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, June 2015.*

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## NEWS

**Summer Educational Events...** (continued from page 1)

Speakers will be Extension specialists Dr. Beth Gugino and Dr. Sjoerd Duiker and Extension educator John Esslinger. The program will include discussions on vegetable pests, biodegradable plastic mulch, and outstanding cover crop options for vegetable growers. Light refreshments will follow. There is no cost and no pre-registration.

July 16, 2015

**Deer and Pest Control on an Organic Farm**

This PASA-sponsored twilight meeting will be held from 6:00 to 8:00 p.m. at the Morris Farm, 110 Slebodnik Rd., Irwin, PA 15642.

Randy Morris of Morris Farm will demonstrate his dynamic means of growing vegetables without crop damage or loss, while coexisting with area wildlife. The techniques are simple and work in harmony with organic practices while maintaining good relations with neighbors that like to have a thriving deer herd. The methods covered also apply to turkeys, groundhogs and insect pests such as cabbage worms, squash bugs, vine borers, and cucumber beetles.

Morris Farm has been certified organic since 1994. After renting farm fields close to their previous home for several years, Morris purchased the 22 acres in Irwin, PA, where they've lived since 2001. With 12 acres under production and a full-time, off-farm job, Morris sells most of his produce through a pick-your-own customer-based model. Extra vegetables are then gleaned from the fields by volunteers "working for food" and sold at a local farmers market.

Registration is \$10 for PASA members and \$15 for non-members. To register go to <http://www.pasafarming.org/events/pasa-events/deer-pest-control-on-an-organic-farm> or call Jessy Swisher at 412-365-2985.

July 29, 2015

**2015 Berks/Schuylkill Vegetable Summer Twilight Meeting**

This twilight meeting will be held from 5:00 to 9:00 p.m. at the Kutztown Produce Auction, 209 Oakhaven Road, Fleetwood, PA 19522.

The meeting will feature a vegetable field pest walk, irrigation and other cultural practices presentation, and a pesticide safety presentation. Vendors will be present to showcase their products and services. This meeting will offer pesticide credits as well. The cost for the meeting is \$10 which includes the meal. To register, contact the Kutztown Produce Auction at 610-683-7161.

August 4, 2015

**Urban Homesteading: August Pest and Pathogen Pest Walk**

This workshop will be held from 6:00 to 8:00 p.m. at the Edible Teaching Garden, 400 North Lexington Street, Pittsburgh, PA 15208.

This August workshop is

part two of the urban twilight meeting sequence, and will complement the July pest walk by focusing on the different pests and pathogens present at the time. Community members will take an interactive walk led by an Extension educator, Lee Stivers, through the Penn State Master Gardener Edible Teaching Garden. The instructor will also inform attendees about responsible and safe ways to alleviate or eliminate the different types of pests identified for this part of the growing season.

Registration is \$25 which includes light refreshments. To register, go to <http://extension.psu.edu/business/farm/courses/urban-homesteading> or contact Rachel Samuels: [ras1024@psu.edu](mailto:ras1024@psu.edu), 412-482-3464. Registration deadline is July 31.

August 4, 2015

**At-Market Workshop at the Penny Packer Farm & Education Center**

This At-Market Workshop will take place at 6:00 to 8:30 p.m. at the Penny Packer Farm & Education Center, 685 Mann Road, Horsham, PA 19044

Join us for a tour of this urban farm and explore their successful CSA marketing model. Penny Packer Farm utilizes a post-harvest handling method adaptable by most any sized farm and they have several years' experience using a CSA to market their extensive mix of produce. You may be interested in how they grade, wash, pack and distribute their weekly farm production. We will also learn about the challenges and opportunities of maintaining and growing a customer base. Join us for this chance to learn from each other! Seasonal farm refreshments will be shared.

There is no cost but pre-registration is appreciated. Call 610-391-9840 to register.

August 5, 2015

**At-Market Workshop at Rohrbach's Farm Market**

This At-Market Workshop will take place at 6:00 to 8:30 p.m. at Rohrbach's Farm Market, 240 Southern Drive, Catawissa, PA 17820.

This evening we will be focused on retail marketing and agritourism activities of this diverse, multi-generation farm. Our

(continued on page 9)

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**Summer Educational Events...** (continued from page 8)

conversations will center on meeting the ever changing demands of customers as well as common methods of pricing and price strategies. Join us for this chance to learn from each other! Seasonal farm refreshments will be shared.

There is no cost but pre-registration is appreciated. Call 610-391-9840 to register.

August 6, 2015

**At-Market Workshop at Risser-Marvel Farm Market & Corn Maze**

This At-Market Workshop will take place at 6:00-8:30 p.m. at the Risser-Marvel Farm Market at 2425 Horseshoe Pike (Rt 322), Annville, PA 17003.

The Forrys are eager to share their experiences from the past several years as they transitioned into farm and market management. In addition to conversations around becoming managers, employers and all that goes along we will cover the topic of market layout and design in depth. Join us for this chance to learn from each other! Seasonal farm refreshments will be shared.

There is no cost but pre-registration is appreciated. Call 610-391-9840 to register.

September 15 & 16, 2015

**“Are You Crazy” Bus Tour**

This year we will be exploring 9 farm markets in Pennsylvania, Virginia and West Virginia. 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. Not to mention the “classroom-on-wheels” as we travel between markets with opportunities to network and learn from each other. This tour is typically attended by farm market owners and managers and other personnel interested in seeing and learning from a variety of retail farm market and agri-tourism entrepreneurs.

Cost \$290 per person. Meals and lodging included. For registration and information regarding the tour, contact Brian Moyer bfm3@psu.edu 610-391-9840

September 24, 2015

**Urban Homesteading: Gardening with Perennials**

This workshop will be held from 6:00 to 8:00 p.m. at the Edible Teaching Garden, 400 North Lexington Street, Pittsburgh, PA 15208.

The Gardening with Perennials Workshop is a perfect way to end the summer growing season. In this workshop, community members will learn about and cultivate an appreciation for using perennial plants in their garden from an experienced Master Gardener. The lecture will cover specifics such as which plants are considered perennials with a focus on native species, how to plant and care for perennials as well as the extended list of uses and benefits of perennial plants. Perfect for the urban setting, perennial plants are hardy enough to return year after year for continued enjoyment while helping to increase biodiversity in city landscapes. Urban homesteaders and community members in attendance will become part of the growing greening effort in Pittsburgh.

Registration is \$25 which includes light refreshments. To register, go to <http://extension.psu.edu/business/farm/courses/urban-homesteading> or contact Rachel Samuels: ras1024@psu.edu, 412-482-3464. Registration deadline is September 21.

October 7, 2015

**Northampton and Lehigh County Vegetable Grower Twilight Meeting**

Join Northampton and Lehigh County Penn State Extension for our Vegetable Grower Twilight from 3:00 to 6:00 p.m at the Unangst Farm, 7317 Bath Pike, Bath, PA 18014..

Take a look at our pumpkin variety demonstration. Learn how to support pollinators using cover crop mixtures. Review this season’s vegetable disease problems and make a plan for next year. Come early to peruse the pumpkins. You will have a chance to view pumpkin pollinator cover crop mixture plots on farm and hear from Dr. Shelby Fleisher, Penn State Extension and growers Roger Unangst and Gary Hunsicker on how the

(continued on page 12)



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## MARKETING

## Farmers Market Opportunities

### Fort Meade Farmers Market

The Fort Meade Farmer's Market is looking for a variety of different vendors to attend their weekly Farmers Markets held every Wednesday from June 10 - Sept. 9, 10 a.m.-2 p.m. at the Fort Meade Pavilion. They are seeking produce, prepared food, flowers, crafts, lunch truck vendors etc. Interested parties should contact 301-677-3579 or 301-252-8688 for more information.

### Reisterstown Farmers Market

This market is seeking an organic grower looking for a Sunday market – they are willing to forgo the market fee. They are also in need of a fruit farmer.

If interested, please contact Alice Reid, Reisterstown Farmers Market, at 443-562-4347.

### Park Heights Community Farmers Market - Baltimore

This market is the oldest mid-week market in Baltimore City. It is located on the grounds of Pimlico Race Course surrounded by the Arlington, Mt. Washington, Cylburn-Levindale, Pimlico Good Neighbors, and Park Heights neighborhoods. They accept all forms of currency and offer two incentive programs for SNAP, WIC, and Senior residents to purchase more. The market runs from June 10 - November 25 from 9:30 a.m. - 2:30 p.m. Set up is from 7:30 – 9 a.m.

They have a diverse range of customers averaging 500 daily and are in direct need of one more produce vendor, a meat/cheese/egg vendor and a bread baker however ALL are welcome. They offer a weekly or seasonal rate for all vendor types and will prorate the fee for anyone who would like to pay seasonally but will miss opening day.

Anyone interested can contact Saché Jones by email at [sjones@phcha.org](mailto:sjones@phcha.org) phone at 443.844.9956 (cell) or 410.542.8190 (office).

### North Square Farmers Market

This market is located in downtown Chambersburg and is actively recruiting vendors for their 2015 season. The market is specifically seeking local vendors who sell meat, poultry, artisan products, vinegars, fermented products (sauerkraut, pickles, etc) and prepared food vendors. They are open Saturday mornings May 23 - October 17 from 8 a.m. to 12 noon. Full, half and day vendors accepted.

Please contact Julia Lehman at [north-squareinfo@gmail.com](mailto:north-squareinfo@gmail.com) or 717-377-9029 if interested. For more information visit [www.northsquarefarmersmarket.com](http://www.northsquarefarmersmarket.com).

### Pigtown Community Farmer's Market

This market held on Tuesday from 3 -7 p.m. from June to October is seeking new vendors. Contact Charlotte Keniston at [ckeniston@gmail.com](mailto:ckeniston@gmail.com) or 603-455-6910.

### Gardenstreet Gardens

This market at 391 West Bay Front Road, Lothian, MD, is seeking local producers of fruits and vegetables. The producer-only market is held every Thursday from June 4 to September 3 from 4 to 7 p.m. Contact Maggie Taylor at [maggie@greenstreetgrowers.com](mailto:maggie@greenstreetgrowers.com) or 410-867-9500 ext. 209.

### Hyattsville Farmers Market

The Hyattsville Farmers Market is a small but growing market located at the very busy intersection of East-West Highway and Queens Chapel Rd. in Prince George's County. The market is on Tuesdays from 3 to 7 p.m., starting June 2nd through and including September 29th; 3799 East-West Highway (Redeemer Lutheran Church Parking Lot), Hyattsville, MD 20782. They are looking for the following vendors: Bread; Eggs, Dairy, and Cheese; Meat; Herbs, spices, plants, and flowers; Prepared Food; Live music/musicians; and Artisans. If you are interested in participating this market season, please contact Ellarose Preston at 301-985-5006 or [epreston@hyattsville.org](mailto:epreston@hyattsville.org). The vendor application is posted to the Hyattsville website <http://www.hyattsville.org/591/Farmers-Market>

### Adams County Farmers Market Association

The Adams County Farmers Market Association is actively recruiting vendors for their 2015 season. Most market locations are open mid-May through October. Wednesday: Location: Gettysburg Heritage Center-297 Steinwehr Ave: Wednesdays: 2 -6 p.m. Friday: Location: The Outlet Shoppes at Gettysburg-Center Gazebo: Fridays 9:30 a.m. – 2 p.m. Saturday: Location: The Outlet Shoppes at Gettysburg-Center Gazebo: Saturdays 9:30 AM – 2:00 PM. Please contact Vicky McCleaf at [vicky@mccleafsorchar.com](mailto:vicky@mccleafsorchar.com) or 717-357-2809 if interested in apply to join these markets.

### The Food Trust Markets

The Food Trust is looking for farmers to join their network of farmers' markets in the Philadelphia area. This season,

*(continued on page 11)*



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MARKETING

**Farmers Market...** (continued from page 10)

Philadelphians will receive thousands of dollars in coupons to spend specifically at farmers' markets. All types of growers are welcome, especially small farms growing a wide variety of produce and specialty producers. Markets are operated every day of the week aside from Monday, with weekday markets running in the afternoon and weekend markets running in the mornings/early afternoon. Markets are typically open from May/June until October/November, but can be dependent on farmers' season. Free training for farmers new to selling at markets. Call Katy Wich at 215-575-0444 ext 1134 or email her at kwich@thefoodtrust.org for an application.

**The Village Farmers Market**

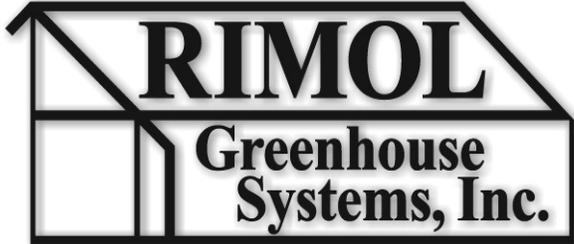
The Village Farmers Market is coming this spring to Baltimore's west side. They are seeking farmers and ranchers selling a variety of products, including vegetables, fruits, meats, fish, eggs, dairy, and herbs. The market will operate each Saturday morning 8 a.m. – 12 p.m. from June through September and is located in the spacious parking lot of the Westside Skills Center at 4501 Edmondson Ave. This highly visible location on Route 40 is just 3 miles inside the beltway and directly across the street from the Edmondson Village Shopping Center. For more information or an application please contact Jill Harrison, market manager, at 443-310-6537 or vjllh@gmail.com.

**Upper Merion Farmers Market**

The Upper Merion Farmers Market is looking for a fruit grower for the upcoming 2015 season. Their season runs from (continued on page 12)

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## NEWS

## Mark Your Calendars – Monthly Grower Conference Calls

Last fall during the Pennsylvania Vegetable Marketing and Research Program's (PVMRP) vegetable research grower conference calls, it was suggested that we conduct periodic grower conference calls during the season to allow growers to talk about problems they are experiencing during the season – and hear recommendations from Penn State extension experts for solving them. Therefore, PVGA and PVMRP are working with Penn State Extension educators and specialists to conduct such a conference every four weeks during this summer and fall.

The calls will be on the following Tuesday evenings from 8:00 p.m. to 9:00 p.m.:

**July 14 • August 11 • September 8 • October 6**

To participate in the calls, growers need to simply call toll-free 1-877-643-6951 and then enter pass code 55835024# at the scheduled time. All callers will be able to speak if they wish or they can just listen in on the discussion.

The first call on June 16 had about eight grower participants and four extension participants. We hope these calls will become a valuable means for growers to ask questions about problems they are having in the field. It will also enable Penn State Extension educators and specialists to get information to growers across the state at the same time. So mark your calendars for these dates and plan to call in with your questions or just listen. Remember it is toll-free.

### Farmers Market...

*(continued from page 11)*

May 16 to November 21. Market day is every Saturday, 9 a.m. -1 p.m. They are a producer - only market. UFMF is located in King of Prussia, PA. Please contact Lydia Dan-Sardinas at [manager@uppermerionfarmersmarket.org](mailto:manager@uppermerionfarmersmarket.org) with any questions or visit their website at [uppermerionfarmersmarket.org](http://uppermerionfarmersmarket.org).

### Harrisburg Broad Street Market

Contact: Broad Street Market Corporation, Ashlee O. Dugan – 828- 230-0451 - [broadstreetmarketmanager@gmail.com](mailto:broadstreetmarketmanager@gmail.com)

### Arundel Preserve Market

The Residences at Arundel Preserve will be starting a farmers market in June 2015. The Market will be open on Sundays, from 10 a.m.-2 p.m. This is a new market and is seeking all types of vendors. Please contact Lisa Barge ([lbarge@aaedc.org](mailto:lbarge@aaedc.org), 410-222-7410) at the Anne Arundel Economic Development Corporation if you are interested in being a vendor at this market. All vendors must be producer only.

### Summer Educational Events... *(continued from page 9)*

cover crops worked. Dr. Beth Gugino will highlight disease issues and controls. Take your marketing challenges seriously and discuss consumer expectations with John Berry, Penn State Extension marketing educator. Network with your fellow farmers over pulled pork barbecue and make your plans for next year.

There is no fee to attend but please make an advance reservation at [extension.psu.edu/vegetable-fruit/events](http://extension.psu.edu/vegetable-fruit/events) or call 610-746-1970. Thank you to Pennsylvania Vegetable Growers, Project Integrated Crop Pollination, and Northampton and Lehigh County for sponsoring this event.



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# Down to Earth Harvest Focuses on Customers

Robert Todd, son of a Kansas carpenter, never thought he would end up in agriculture. He first entered the field by agreeing to help his friend Phil with deliveries at a local CSA farm in Philadelphia.

“My father was a carpenter so I learned to enjoy working with my hands,” Robert said. “I found satisfaction in growing crops and experiencing the farm to table process”.

The two friends eventually went their separate ways to start their own operations. Robert was able to find a farm in Kennett Square and began his operation called Down to Earth Harvest.

Robert is accompanied on the farm by his wife Amy, who manages their CSA program and handles the “business” side of the farm.

Down to Earth Harvest is currently in its sixth year of operation. Robert and Amy are planning to move from their current Kennett Square location to a new six acre farm in Downingtown. Robert believes that the move will bring his family closer to the community, as the new location is around the corner from a nearby neighborhood.

“Our primary focus is on our customers,” said Robert. “We wanted to ensure our customers receive farm fresh produce either through our CSA or at local farm markets.”

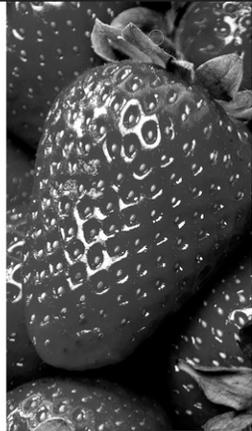
In the future, Robert hopes to add a few more perennial

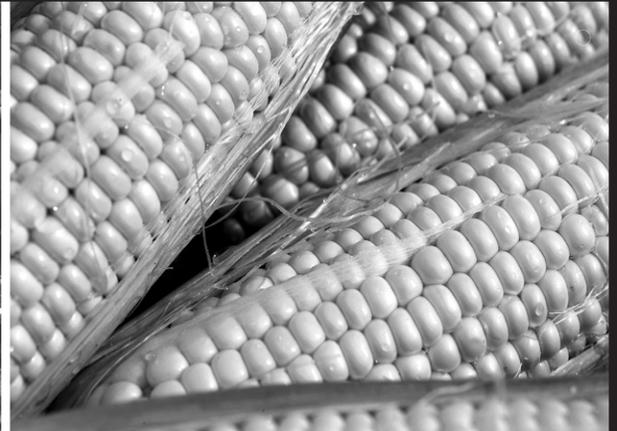


crops to their harvest while still remaining a relatively small farm so they can continue to focus on their customers.

“Instead of getting bigger, we want to get better and work with what is available to us,” Robert said. “We hope to stay small and make the most of our farm.”









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## VEGETABLE PRODUCTION

**Wanted: Samples of Celery Leaf Curl Disease***Beth Gugino*

Celery leaf curl is a relatively new disease of celery in Pennsylvania and the U.S. In an effort to learn more about the disease, we are interested in collecting as many samples as possible in 2015.



*Downward curling of leaves characteristic of celery leaf curl disease (Photo: Sara May)*

Celery Leaf Curl Disease (CLCD), also called celery anthracnose, is an emerging disease in the U.S. that was first described in Queensland, Australia back in 1981. In 2010, the disease was almost simultaneously observed in Pennsylvania,

Virginia and Michigan. Since then, the Penn State Plant Disease Clinic has received CLCD samples each year. Other states that have also recently reported CLCD include CT, MA, NY, as well as, Ontario and Nova Scotia, Canada.

Symptoms: The most common symptom of the disease is the characteristic downward curling of the leaves (leaf epinasty) which may look similar to herbicide damage. Other symptoms include petiole twisting, petiole lesions, leaf spots and the formation of adventitious roots along the petioles. Lesions on the crown or heart of the celery plants can often lead to secondary infections and rotting of this part of the plant.

*(continued on page 15)*

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**VEGETABLE PRODUCTION**

**Wanted: Samples of Celery...** (continued from page 14)



*Crown lesions characteristic of celery leaf curl (Photo: Sara May)*

In Pennsylvania, CLCD is caused by the fungus *Colletotrichum fioriniae* (= *Colletotrichum acutatum*). Unfortunately, not much is known about the biology or how to best manage the disease. So far, research from other celery production regions has shown that all the celery cultivars evaluated were susceptible to CLCD and some fungicides applied during the season may help reduce disease incidence and/or severity. A trial is currently underway at the Russell E. Larson Research and Education Center at Rock Springs to evaluate the efficacy or select conventional and organic fungicide for disease management under PA environmental conditions and a cultivar trial is being planned for the research farm in Landisville.

In an effort to learn more about this disease and why it seems to have suddenly appeared in the U.S. several years ago and stayed, we are interested in collecting as many samples as possible. If you suspect that you may have CLCD please contact and send a sample to Sara May at the Penn State Plant Disease Clinic.

Sara R. May, Director  
 Penn State Plant Disease Clinic 220 Buckhout Lab  
 University Park, PA 16802  
 814-865-2204

*Dr. Gugino is with the Department of Plant Pathology and Environmental Microbiology. From Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news>, May 28, 2015.*

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## VEGETABLE PRODUCTION

## Farming Like You Expect Bacterial Diseases

Steven Bogash

One consistent theme over the past several years has been the specter of dealing with bacterial diseases in our tomato fields and high tunnels. Bacterial speck, spot and canker have become regular challenges for Pennsylvania and Mid-Atlantic tomato growers. In spite of these challenges, it is possible to grow profitable tomato crops in this region.

One tactic that seems to make the most sense is to be proactive and simply learn to farm tomatoes as if you expect bacterial diseases rather than waiting for any of them to be identified in your operation then beginning treatment. Successful management really requires a season-long approach. The list below contains some practices that have the potential to put tomato growers back in front of these diseases.

**Hot water seed treatment** - One of the foundations of any program to manage bacterial diseases is to always use tomato seeds that have been properly heat treated. There is an excellent set of instructions in the Ohio State Fact Sheet "Hot Water and Chlorine Treatment of Vegetable Seeds to Eradicate Bacterial Plant Pathogens, HYG3085-05". If you decide to treat broccoli seeds, be ready to plant them immediately as the seed coats are likely to pop off. Also, the hot water directions need to be followed precisely, so stove tops are not a good choice. We've got several sets of hot water baths available around the state. Contact your local horticulture educator for locations of the baths.



**Greenhouse sanitation** - Getting your transplants from a reputable source that keeps their transplant production area immaculate and uses hot water seed treatments is a great first step to disease-free fields, tunnels and greenhouses. If you grow your own, practice the highest levels of sanitation in your transplant production areas. Never let your hose ends touch the ground, use disinfecting foot baths at all entrance areas and refresh the solutions regularly, if reusing trays pressure wash them first, then dip into an approved sanitizing solution, never store cardboard boxes under benches, keep potting media covered between uses, use disinfecting solutions on all work areas and benches between project runs, and keep non-authorized people out of critical production areas.

**Longer rotations** - Current recommendations are to stay out of fields that have a history of bacterial infections for at least three years. Even longer is better to ensure that any crop residue that can harbor disease inoculum is thoroughly decomposed.

**Replace your used wooden stakes** - It is nearly impossible short of kiln drying used wooden tomato stakes to completely disinfect them. Bacteria are very tiny and can penetrate even very small openings in stakes. In addition, they can form protective coverings (biofilms) that are very difficult for disinfectants to penetrate. Even a very small population of bacteria can create a new infection. Therefore, it is worthwhile to either replace wooden tomato stakes annually or move to metal "T" posts that

(continued on page 19)

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**Farming Like You...** (continued from page 18)

can be power washed then dipped in a disinfectant such as GreenShield, peroxide, or bleach.

**Weed management** - Weeds can harbor the same bacteria that infect your tomatoes. This is especially so for weeds in the Nightshade family, but they are far from the only plants that are suspected of harboring bacterial fugitives. Better long term weed management can greatly reduce any disease inoculum.

**Tanos alternated with copper** - At least one study from North Carolina found that alternating Mancozeb + copper with chlorothalonil (Bravo and others) + Tanos was highly effective in managing bacterial canker. Mancozeb + copper (ManKocide) has been well documented as effective in managing bacterial diseases in tomatoes, but coverage is essential since these are protectants. Once the bacteria are in the plant, they are protected from exposure to many of these products. The greatest challenge with Mancozeb-based programs is the 5 day PHI; what do you do once harvest begins?

**Use a biostimulant** - Actigard, Stimplex, Regalia, Fertileader(s), and Greenstim: Actigard is well recognized as an important part of any program managing bacterial diseases in tomatoes. Like many of the other biostimulants, it stimulates the plants own defensive systems. They are best used as part of a preventative program starting early in the season, but have shown some efficacy in keeping a field operational even after one or more bacterial diseases have been identified. It really helps if any diseases are identified early as these are not cures, so scout often and get suspect plants to a lab.

**Higher copper coppers** - The balancing act between having sufficient copper in forms that are highly active against bacteria and reducing residues on fruit is a constant challenge. However, you must have enough copper in solution to actually help in managing diseases. When working with different products, it is important to keep good notes on how they performed under your production and conditions to help inform your material choice decisions in the future.

**High levels of sanitation** - Preventing people, tools and equipment from moving bacterial diseases between infected plants and fields is vital in managing these diseases. Bacteria ooze out to the edges of leaves and are readily picked up and moved on clothing and equipment. Always work in 'clean' areas first, then move on to infected areas or suspect infected areas last. Be sure to pressure wash all equipment after being in fields that are even suspected of having bacterial pathogens. Do the same to tools and boots. It's worthwhile to change clothing after working in suspect areas. While it is hard to imagine not wanting to start the day in clean clothes, there are workers that wear the same clothes more than one day at a time. Compared to the potential losses from bacterial diseases, providing clean company provided uniforms may be a minor expense.

**Cull hard when necessary, scout often** - Scout your fields and plantings often. Remove

suspect plants and get any problems accurately identified. If you suspect a bacterial disease, contact your nearest Penn State Extension Horticulture Educator or send a sample directly to the Penn State Plant Disease Clinic. More information on how to use the Plant Disease Clinic.

**Timing, wait until after the leaves are dry** - As noted earlier, bacteria ooze out to the edges of the leaves through hydathodes early in the day. As you work fields tying, spraying, harvesting and performing other maintenance chores, it is very easy to pick up and move bacteria to non-infected plants. By

(continued on page 21)



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VEGETABLE PRODUCTION

# Pesticides and Pollinators

Tianna DuPont, Christina Grozinger, and Shelby Fleischer

Researchers believe that long term honey bee declines are a result of a complex set of factors. The primary suspects are: poor nutrition, pesticides, pathogens/ parasites, and poor quality genetic stock. Here we will consider recent research results describing how pesticides might affect pollinators.



*Bombus in pollinator cover crop plots.*

Honey bees across North America are

exposed to multiple pesticides. Photo credit Tianna DuPont.

Chemical analysis shows that honey bees and their hive products contain many pesticides derived from various sources, including agricultural crops and horticultural gardens. Beekeepers also apply pesticides and antimicrobial drugs to control pathogens and parasites, including Varroa mites. Chris Mullin, Maryann and Jim Frazier and colleagues analyzed 1300 pollen samples and found that 91% were contaminated with pesticides [31]. The most abundant pesticides in hives were acaricides applied by beekeepers to control Varroa mites, and fungicides that were applied to nearby flowering crops. Acaricides, antimicrobial drugs and fungicides are not highly toxic to bees alone, but in combination there is potential for heightened toxicity due to interactive effects [32].

The cocktail of pesticides that bees are exposed to is most striking. On average, there were six pesticides in each pollen sample, up to 31 pesticides in a single pollen sample, and 39 pesticides in a single wax sample. Think about what the first thing your doctor asks you when you visit the clinic: are you taking any medication? We know that multiple chemicals in the body can react to create toxins. The interactions between these pesticides can be very complicated and difficult to predict.

Lethal and sub lethal effects - Pesticides are now labeled for their direct bee toxicity. Toxicity is measured by the amount which kills 50% of bees or LD50. Look for the symbol on the label insert photo here. If the Acute Contact LD50 is less than or equal to 2 micrograms per bee, the pesticide is classified as Toxicity Category I, "highly toxic to bees." If the LD50 of the pesticide is greater than 11 micrograms per bee (Toxicity Category III), it is relatively nontoxic, and no bee caution statement is required on the label. Visit The Tree Fruit Production Guide For a listing of Toxicity of insecticides, miticides, fungicides, and blossom- and fruit-thinning agents to honey bees.

Pesticides are also being evaluated for their sub-lethal effects on bees. Impaired learning, impaired foraging and homing ability, and reduced immune response are all possible sub-lethal effects of pesticide exposure. Lifespan is also affected by pesticide exposure; in some cases treated bees live only a few days, rather than their normal 6-week lifespan during the foraging season.

Inert ingredients may impact bee health - Perhaps most surprising is that 'inert' ingredients may be impacting bee health. Penn State toxicologist Dr. Mullin explains that there are

more than 2,000 additives and 20,000 formulations that farmers work with. These products improve how well insecticides and fungicides work by helping them stick to the plant and helping

*(continued on page 22)*

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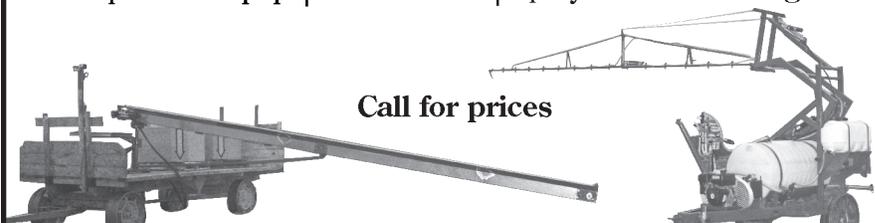
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**Farming Like You...** (continued from page 19)

waiting until the plants are completely dry in the morning, you can reduce spreading bacteria.

One program that worked well in bacterial canker infected fields in 2014 - Several clients that work with this educator had tomato fields with plants that were positively identified with being infected with Bacterial Canker last season yet they were able to harvest these same fields right through the growing season. The treatment program that was used in these fields consisted of:

- Injecting Regalia at the 4qt/ acre rate every other week.
- Foliar applications with Actigard every other week. Actigard can also be injected.
- Alternating foliar applications with Mancozeb + copper with Regalia + copper.
- The application of another biologically-based biostimulant every other week such as GreenStim, Fertileader product, Fertilactyl Kalibor, Stimplex, or seaweed-based materials. Do this application on the opposite week as the Actigard application.
- Keeping plants at their peak nutritionally using biweekly tissue testing and adjusting the nutrition program as needed.
- Culling infected plants as well as the plants on either side as necessary.

While beating bacterial diseases may not be possible, proactively managing them may be the path to creating a sustainable living situation with them.

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/vegetable-fruit/news>, May 27, 2015.

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## VEGETABLE PRODUCTION

**Pesticides and Pollinators** (continued from page 20)

the active ingredient pass through the outer membrane of the plant, among other functions. The bulk of synthetic chemicals used are formulated ingredients that are unmonitored, un-disclosed, and the residues remain unmonitored. Because the non-active ingredients are assumed to be non-toxic, companies are not required to disclose ingredients or monitor toxicity. However, in some cases, formulations which include 'inerts' have a greater impact on bees than the active ingredients by themselves [33]. In one example, the toxicity of the fungicide captan to honey bee brood development was attributed to formulation ingredients other than the active ingredient alone [34]. In another study, even at the lowest concentration of 0.01% the inert ingredient N-methyl-2-pyrrolidone (NMP) caused 50% mortality of bee larvae after four days [35].

Bees explore their environments by smell and what they learn allows them to find and return to locations with many food resources of pollen and nectar. In a recent study, researchers found that some types of spray adjuvants affected bee ability to learn [36].

**Neonicotinoids** - We can't talk about pesticides and pollinators without touching on the issue that has been so predominately in the news: neonicotinoids. Imidacloprid and other neonics are "nicotinic acetylcholine receptor agonists," meaning they bind to and block open nerve receptors in the insect brain, causing paralysis and death. Most neonics are toxic in insects in minute quantities. The LD50 of imidacloprid (the dose that kills 50% of individuals) for honey bees is 5 nanograms per insect. Neonics are systemic, which means the plant absorbs them and moves them throughout their tissues to protect multiple parts of the plant, even parts that were not sprayed directly. Because the neonic is systemic, small amounts can be present in the nectar or pollen that the bees collect for food (usually between < 1 and 8 parts per billion (ppb) in nectar and <1 and 50 ppb in pollen). Although normal field levels from neonic seed treated plants are unlikely to be directly lethal (a 0.1 g bee would have to drink several millilitres of nectar or eat a gram or so of pollen); there is strong evidence of negative sub-lethal effects. Exposure to sub-lethal doses of neonicotinoids is known to reduce learning ability, foraging ability and homing ability in both honey bees and bumble bees [37, 38]. Levels will also be higher in sprayed vs seed treated plants.

**Fungicides** - Fungicides are often applied to crops in bloom when honey bees are present both because crops in bloom are susceptible to fungal and bacterial diseases and because fungicides are currently deemed safe for bees. Chlorothalonil is a broad spectrum fungicide which is often included in a crop protection program to help reduce the possibility of diseases developing resistance. Recently, researchers have found that some fungicides have direct toxicity to bees at field use rates [39]. They have also learned that fungicides stored in pollen can inhibit the growth of beneficial fungi in the digestive tracks of bees and as a consequence make it harder for larvae to get the full nutritional value from the pollen they digest [40].

Penn State's pollinator research team fed honey bee larvae royal jelly, fructose and yeast laced with pesticides at levels based on those found in pollen in prior research. Fluvalinate and Coumaphos are common miticides used by beekeepers in the hive. Chlorothalonil a broad spectrum fungicide and chlorpyrifos a broad spectrum insecticide. Not only did the fungicide chlorothalonil directly increase mortality, the probability that larvae would survive four days was only 50% when chlorothalonil was mixed with coumaphos miticide compared to 90% with just the miticide [35]. This is a brand new area of research and we expect greater clarification as it is explored.

Interactions between multiple factors - The combination of exposure to pesticides and reduced nutrition may make bees more susceptible to the other major suspects in bee decline: parasites and pathogens. "Pesticides plus viruses is the double whammy that kills hives and bees," says Dr. Cox Foster.

This article is part of a five part series describing pollinators, pollinator threats and on-farm conservation strategies as part of a collaboration between Penn State's Center for Pollinator Research and Penn State Extension Vegetable and Small Fruit Team.

For references see online version at <http://extension.psu.edu/vegetable-fruit/news> or contact PVGA at 717-694-3596.

*Ms. DuPont is with Penn State Extension and Dr. Grozinger, and Dr. Fleischer are 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/vegetable-fruit/news>, June 11, 2015.*

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# Flea Beetle Management

Flea beetles have emerged from their overwintering homes in the shrubby or wooded areas surrounding fields and begun to feed on the first spring brassica plantings. This article from UMass Extension's Vegetable Notes (Vol. 27 Number 6) has great information on flea beetle management.



*Effect of push/pull system. Kale treated with Surround is protected from damage (top and bottom) while untreated bok choy (center) draws flea beetles, where they can be sprayed (hopefully before they cause this much damage!). Credit: UMass Extension.*

Controlling flea beetles can seem like a losing battle, but we have seen real success on farms that have taken an integrated approach to management. The most important steps to reducing the population size and damage caused by flea beetles seem to be breaking the cycle (rotating spring crops as far as possible from overwintering sites near last years' fall crop), and controlling early season outbreaks using something like a trap crop or a "push-pull" approach to prevent the problem from spiraling out of control within the season or from building up to unmanageable levels over the years.

## Life Cycle

The crucifer flea beetle (*Phyllotreta cruciferae*) is uniformly black and shiny, while the striped flea beetle (*Phyllotreta striolata*) has two yellow stripes on its back. Both are about 2 mm in length and hop away when disturbed. These flea beetles only feed on brassica crops; those found on corn or solanaceous crops are different species. Though they prefer the tender leaves of Brassica rapa & B. juncea crops such as arugula, tat-soi, mizuna, bak choy, and mustard, they will also feed on the more waxy Brassica oleracea crops such as broccoli, cabbage,

*(continued on page 24)*




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## VEGETABLE PRODUCTION

### **Flea Beetle Management** (continued from page 23)

kale and collard. Their feeding damage—small, round holes on leaves or leaf margins, which can coalesce to form large holes as leaves mature—can destroy or delay maturity in seedlings and reduce yield and marketability of older plants. The adults in fields now will lay their eggs in the soil. Larvae will feed on the root hairs of brassica crops, pupate underground, and emerge as adults in late July to feed on fall brassicas before moving outside of the field for the winter.

#### **Management**

**Break the cycle** - Plant spring crops far from fields where fall brassicas were grown, and where flea beetles will overwinter. When overwintering beetles emerge, if they can't find a host plant they will not survive and reproduce and you will reduce the population of flea beetles on your farm. You can also starve the overwintering beetles by delaying planting until July. This may not easily fit your markets, but it does work. With no food or place to lay eggs, the overwintered adults leave the area, instead of reproducing and emerging in time for midsummer dining. It may take 2-3 years to bring populations down. Control weeds at the same time. The best protection for a spring brassica planting is isolating the crop from where the beetles would have overwintered, near last years' fall crop. Finally, separate your fall crop from the spring crop, since second generation flea beetles will emerge at the same time that fall cole crops will be at their most vulnerable. These second generation adults are also the beetles that overwinter, so next spring, plan to use a field distant from previous late-season brassica fields. After harvests, till crop residue immediately to uproot and kill underground larval populations.

**Row covers** - Floating row cover provides the most effective protection from flea beetles, especially in spring and early summer. It is expensive in both materials and time, but it works. It is critical to seal the edges immediately after seeding, because brassica seeds germinate quickly and beetles rapidly find the cotyledons. Flea beetles can fit through small openings - not to mention the large holes and tears that often develop in row cover over time. Edges of the cover must be sealed on all sides using soil, black plastic bags filled with soil, or some other method. Fortunately hoops are not needed on brassica crops, but management is still time-consuming because the cover has to be removed for cultivation. Replace it as soon as possible to avoid letting beetles in.

Other insect barriers, such as Proteknet, Biothrips, and Filbio, are available in a range of mesh sizes and can be used to protect against a variety of pests, including flea beetles.

These provide less heat and greater air circulation than spunbonded row covers, though for early spring crops, the additional warming benefit of traditional row covers of various weights may be preferred.

**Chemical control** - Maturing plants should be scouted frequently. When plants are young, an average of 1 beetle per plant or 10% average leaf damage is a reasonable threshold for chemical intervention. Several synthetic pyrethroids (Group 3A), carbamates (Group 1A), neonicotinoids (Group 4A, either as foliar or soil drench), and the relatively new diamide class (Group 28) are labeled for flea beetle in brassicas. Avoid repeated use of one type of chemistry over multiple generations or using both soil and foliar applications of the same group. Note that as of 2012, the registration for Thionex has been cancelled and is no longer allowed on cole crops. Soil-applied systemic insecticides, such as Admire Pro and Actara can provide longer term control against damage, although beetles may still be seen when scouting. Products containing the new active ingredient cyantraniliprole, a diamide (Exirel for foliar applications; Verimark for soil), are labeled for flea beetle and have been shown in trials to have good efficacy against this pest. Be aware that systemic insecticides may have longer days to harvest intervals. With foliar sprays, even if good control was achieved, re-infestations can occur rapidly and may require additional sprays.

For organic farmers, the choice of chemistries includes spinosad (Entrust) and pyrethrin (Pyganic). In UMass trials, Entrust showed the greatest efficacy in suppressing flea beetles and reducing damage, while Pyrethrin (Pyganic EC 5) showed poor to moderate efficacy in our trials but is reported by growers to cause a significant short-term knockdown. Abby Seaman, NYS IPM, found in 2012 trials that both kaolin (Surround WP) and hot pepper wax worked well. They did not prevent enough feeding for salad greens to be marketable, but they did prevent enough feeding for broccoli, cauliflower, cabbage, etc. to outgrow the damage. In 2013 NYS trials, Entrust, as well as both Venerate and Grandevo, two OMRI-approved bioinsecticides, were all found to significantly reduce damage from flea beetle on cabbage under low pest pressure. Another promising organic product is Azera, a mix of azadirachtin and pyrethrins. A 2011 University of Maryland trial found that Azera significantly reduced flea beetle feeding damage, and that mixed with Surround, it both reduced feeding damage and maintained efficacy over time.

**Control brassica weeds** - Brassica weeds also harbor flea beetles (both adults and larvae) and reduce the efficacy of your crop rotation schemes that aim to break the pest cycle by changing crop families. Yellow rocket, wild mustard, and shepherd's purse are familiar weeds that are widespread in fields and roadsides. The list of weed hosts probably also includes garlic mustard (*Alliaria petiolata*), a serious invasive weed in the brassica family. It is a biennial with white blooms in spring (May). It thrives in roadsides and field edges as well as shady woodlands, and has rapidly spread throughout Massachusetts. A good fact sheet on garlic mustard can be found here or through the Invasive Plant Atlas of New England (IPANE) website.

**Trap cropping** - Take advantage of the flea beetle's preferences for particular brassicas by using the preferred species or varieties as a draw. Their numbers will build up in the more attractive plants, and are less likely to move into or stay in those less preferred. A border or even a middle row planted to Brassica rapa or B. juncea crops such as Komatsuna, tatsoi, mizuna, bak choi, and mustard has been shown to reduce num-

(continued on page 25)

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VEGETABLE PRODUCTION

**Flea Beetle Management** (continued from page 24)

bers and feeding damage on less preferred *B. oleracea* crops such as broccoli, cabbage, or traditional kale (eg, Winterbor types). Red Russian kale (*B. napus*) and Lacinato kale (*B. oleracea*) seem to be of intermediate attractiveness.

To make it work, here's some tips:

- Make sure the trap crop is established before the main crop (the one you are trying to protect) or is at least as big (e.g. transplanted same day). Direct-seeded crops can be used around transplants if seeded 7-14 days earlier.
- Use a fast-growing, vigorous cultivar for the trap crop.
- Use a border crop to prevent beetles from moving farther into the field. Traps at ends of rows help make a complete perimeter, which stops beetles coming from all directions. Interior trap crops also can act as a 'sink' within the field.
- Spray only the trap crop to kill the accumulated beetles, and avoid having to spray the main crop. You also want to keep the trap crop viable enough to do its work, and potentially be harvestable as well. Use a longer-residual product, if possible.
- Combine with a repellent on the main crop. Surround WP and garlic sprays can be used for this purpose.

A variation on this theme is the push-pull system, in which most of the brassica crop is treated with a repellent such as Surround, to "push" the beetles to a sensitive crop (e.g. bok choy or mustard), which is left untreated. This strategy limits the amount of time and material used in controlling the pest, since you only need to spray the "pull" crop, instead of all of the brassica acreage with an insecticide. The trick is to catch the beetles on the sensitive crop before they cause too much damage there, or make the "pull" crop something you don't intend to harvest, like an extra row of direct-seeded mustard. We saw this work really well on a farm in MA where flea beetles had built up

to very high levels and were a major production challenge. When the farmers combined this strategy with crop rotation, separating spring from fall fields and going into a field that had been out of brassicas several years, the results were impressive. So there is hope!

Resource: Hazzard, R. "Materials for Beating Flea Beetles in Brassicas". New England Vegetable and Fruit Conference, 2005 Conference Proceedings

Updated by L. Mckeag and S. Scheufele, UMass Extension, Vegetable Program.

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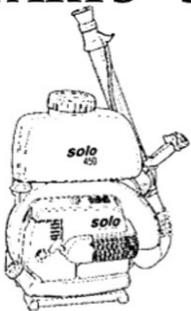
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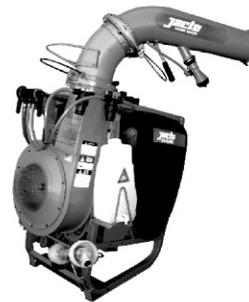
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## VEGETABLE PRODUCTION

## Broad Mites in Fruiting Vegetables

Michael Myers, Technical Sales Representative, Nichino America, Inc.

Broad mites have recently been more of a problem on tomatoes and peppers in Pennsylvania and its neighboring state, Maryland. Damage by broad mites can be quite severe on tomatoes and peppers so growers need to be prepared to protect crops with an effective miticide before these pests cause economic loss.

Already this year, Steve Bogash of Penn State is seeing the broad mite problem repeat itself. Based on his experience, Bogash is recommending treatments for broad mites earlier in the season to prevent them from building and reaching economically damaging levels on tomatoes and peppers.

For 2015, Steve is recommending a miticide application specifically for broad mites at the formation of the first flowers and a second application four weeks later. Bogash knows that by the time damage is observed, it is far too late to react. An early application timing is advisable if broad mites have been a problem in past production. Bogash warns that growers who delay treatments risk sustaining high economic losses by the time damage is observed.

Steve detected broad mite feeding damage during an inspection of transplants last month in greenhouse peppers. Therefore, pepper and tomato plants may require miticide applications for broad mites as early as the seedling stage. According to Bogash, unlike spider mite damage, plants attacked by broad mites may not recover and often are permanently stunted.

The challenge in minimizing damage is due to the extreme difficulty in scouting for them. It's not just their very small size but where they feed. Unlike spider mites that can readily be seen without a hand lens and are associated with feeding on the bottom of leaves, broad mites feed within growing meristems and require higher magnification than most growers utilize. Bogash has often observed fruit damaged from broad mites but no discernable broad mites in dissected plant meristems. He is convinced this damage was from broad mites, but they appear to have either moved on or been killed before the damage was spotted. This appears to be a common problem.

Dr. Tom Kuhar, VA Tech vegetable entomologist, has observed similar problems in commercial tomato and pepper production in Virginia. According to Dr. Shelby Fleischer of Penn State, it only takes seven to eight days for mites to go from egg to adult when temperatures are above 85 degrees. Fleischer reported pesticide applications can flare mite problems by eliminating predators and by increasing the reproductive rate of mites at sublethal doses. (Source: Vegetable and Small Fruit Gazette).

**Chemical Management - Portal XLO Miticide** - Portal XLO has demonstrated outstanding efficacy on broad mite in university research studies. Based on efficacy trials conducted, Portal XLO is very effective at controlling broad mites (Kuhar). Moreover, growers producing quality peppers and tomatoes depend on Portal XLO to protect plants while maintaining profitable yields.

Since it was first introduced in 2009 for fruiting vegetables, Portal XLO has provided growers fast knock down of mite populations, including two-spotted spider mites. Portal XLO is generally applied mid-season or upon the establishment of an economical threshold. Since broad mite damage on fruiting vegetables may occur much earlier in the growing season, growers should consider Portal XLO applications when broad mites are

first detected or the damage to plants is believed to be from broad mite feeding.

Portal XLO is classified by IRAC in Group 21A and should be rotated with miticides with a different mode of action. Because Portal XLO is a contact miticide, optimal performance requires uniform and thorough spray coverage. Improving spray coverage with Portal XLO will improve the control of broad mites and two-spotted spider mites. The addition of a nonionic activator type wetting, spreading, or penetrating adjuvant is recommended to improve coverage and to maximize uniformity of spray applications.

Portal XLO works quickly to knock down mites and provides rapid cessation of feeding. It controls all motile stages of mites - larvae, nymphs, and adults. In addition, Portal XLO provides control of whiteflies and tomato psyllid in fruiting vegetables. The recommended use rate is 2 pints per acre, using a minimum of 20 gallons of water per acre. The maximum use per acre per crop cycle is 4 pints, and the preharvest interval is 1-day.

*Mr. Myers is a Technical Sales Representative for Nichino America, Inc.*

## Other Materials for Broad Mite Management

Steven Bogash

While Portal XLO has proven to be an excellent miticide for managing broad mites in our high tunnels at the Penn State SE Research Farm (SEAREC and Landisville Farm), there are other options to control this pest. Here are some other options for broad mite control:

**Oberon:** The rate for Oberon is 7.0 - 8.5 fl oz/acre and allows for up to 3 applications per season. The PHI is one day on tomatoes and peppers. Since Oberon has an IRAC code of 23 and Portal XLO is 21A, this could be a good material to rotate to in order to prevent pesticide resistance.

**Zeal:** Zeal is registered for use on peppers and eggplant for spider mites in PA, but has a special needs label in Florida for broad mites. With an IRAC code of 10B, Zeal could be important in managing resistance. Since spider mites are a constant irritant in tunnels, by managing spider mites, you also get broad mite control. The rate is 2.0 - 3.0 oz/acre with a 7-day PHI.

**Met 52:** Growers in California have found Met52 to be an effective biological control for broad mites. The label rate is 8.0 - 64.0 fl oz/acre with a 0-day PHI.

**Grandevo:** Work in Florida demonstrated efficacy in using this biological for broad mites. The rate is 2.0 - 3.0 lbs/acre with a 0-day PHI

**Venerate:** This newest product from Marrone Bio Innovations has also demonstrated broad mite control. The rate is 4.0 -8.0 qts/acre with a 0-day PHI.

*Mr. Bogash is with Penn State Extension in Cumberland County.*

VEGETABLE PRODUCTION

**Broad Mite Information**

The broad mite (*Polyphagotarsonemus latus*) can cause serious damage to vegetable crops. These mites are extremely small which makes it difficult to detect the mites before severe feeding damage is evident. Broad mites are about half the size of two-spotted spider mites.

Description of Broad Mites

**Adults** - Female mites are about 0.2 mm long and oval in outline. Their bodies are swollen in profile appear colorless or have a light yellow to amber or green in color cast with an indistinct, light, median stripe that forks near the back end of the body. The two hind legs of the adult females are reduced to whip-like appendages. The male is smaller (0.11mm) and faster moving than the female. Males are similar in color but lack the stripe. The male's enlarged hind legs are used to pick up the female nymph and place her at right angles to the male's body for later mating (Peña and Campbell 2005).

**Eggs** - Broad mite eggs are colorless, translucent, and elliptical in shape. They are about 0.08 mm long and are covered with 29 to 37 scattered white tufts on the upper surface that look like rows of diamonds (Denmark 1980, Peña and Campbell 2005, Baker 1997). Broad mite eggs tend to be laid so they are more exposed on the underside of the leaf or stem surface (Leanne Pundt, Extension Educator, University of Connecticut, 2001, updated January 2013).

**Larvae** - Young broad mites have only three pairs of legs. They are slow moving and appear whitish due to minute ridges on the skin (Peña and Campbell 2005). The quiescent stage appears as an immobile, engorged larva (Baker 1997).

**Nymph** - After one day, the larva becomes a quiescent nymph that is clear and pointed at both ends. The nymphal stage lasts about a day. Nymphs are usually found in depressions on the fruit, although female nymphs are often carried about by males (Peña and Campbell 2005).

**Biology** - The broad mite has four stages in its life cycle: egg, larva, nymph, and adult. Adult females lay 30 to 76 eggs (averaging five per day) on the undersides of leaf surface and in the depressions of small fruit over an eight- to 13-day period and then die. Adult males may live five to nine days. While unmated females lay male eggs, mated females usually lay four female eggs for every male egg. The eggs hatch in two or three days, and the larvae emerge from the egg shell to feed. Larvae are slow moving and do not disperse far. After two or three days, the larvae develop into a quiescent larval (nymph) stage. Quiescent female larvae become attractive to the males which pick them up and carry them to the new foliage (anonymous a, Baker 1997, Peña and Campbell 2005).

**Feeding Damage** - This destructive pest causes terminal leaves and flower buds to become malformed or killed. The mite's toxic saliva causes twisted, hardened, and distorted growth in the terminal of the plant (Baker 1997). Leaves turn downward and turn coppery or purplish. Internodes shorten and the lateral buds break more than normal. The blooms abort and plant growth is stunted when large populations are present (Denmark 1980, Wilkerson et al. 2005, Anonymous a). Fruit is discolored by feeding, and in severe cases, premature fruit drop may occur. Severely damaged fruit is not salable in the fresh market but may be used for processing (Peña and Campbell 2005).

(continued on page 28)

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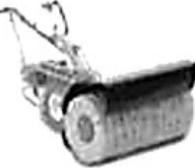
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## VEGETABLE PRODUCTION

**Broad Mite Information** (continued from page 27)

*Broad mite injury on tomato*  
Dr. Jerry Brust, University of Maryland, used with permission



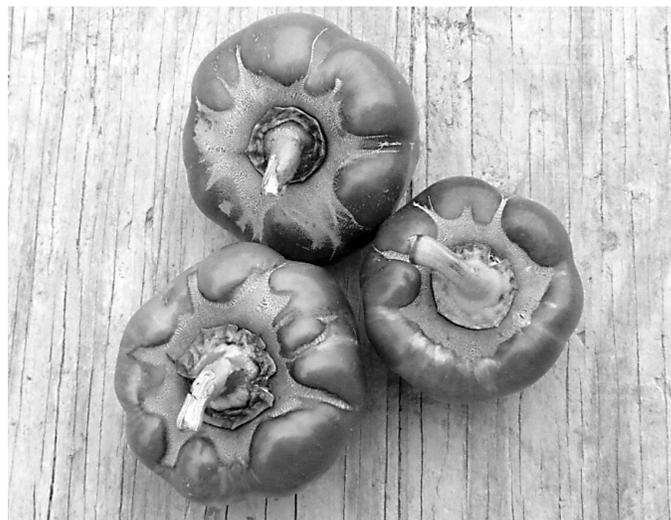
*Outer cells scorched by broad mite on pepper*  
Dr. Jerry Brust, University of Maryland, used with permission

**Scouting and Detection** - Regular inspection of crops for their feeding damage is the best way to detect infestations. Look for malformed terminal buds and stunted growth on any of the suspect hosts. Mites are usually seen on the newest leaves and small fruit. The mites may crowd into crevices and buds (Denmark 1980). Mites prefer the shaded side of fruit which usually faces the plant, so time and effort must be expended for proper fruit inspection. Broad mites may be found where they feed, on the underside of the leaves. Broad mites are very small and difficult to see without a 10x or stronger hand lens (Peña and Campbell 2005). It is possible to detect the eggs using a 20x hand lens, but even this magnification does not provide accurate counts required for threshold numbers. For deter-

mining the necessity of miticide applications, examine the underside of the leaves using a dissecting microscope with a magnification of 25-40x for the presence of mite eggs, nymphs, and adults.



*Broad mite damage to pepper*  
Dr. Jerry Brust, University of Maryland, used with permission

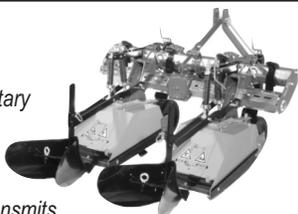


*Broad mite damage on pepper fruits.*  
Steven Bogash, Penn State Extension, used with permission.

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**BERRY PRODUCTION**

**Fruit Rots in the Rain  
Risk Assessment Overview  
for Spring 2015 and Smart  
Spray Techniques in  
Response to Rain Events**

*Cassandra Swett and Kari Peter*

Rain, rain, go away, but if you don't, when should I spray? Admittedly this is not going to become the next popular hit tune on U-tube, but perhaps it rings a bell.

The Berry Pathology program at the University of Maryland (UMD) has recently installed two weather stations in Maryland, which we are using together with NEWA stations in Pennsylvania to monitor fruit rot pathogen activity (Figure 1). Although there are many weather stations in the area, these are the only ones to monitor leaf wetness, a necessary component to fruit rot risk assessment.

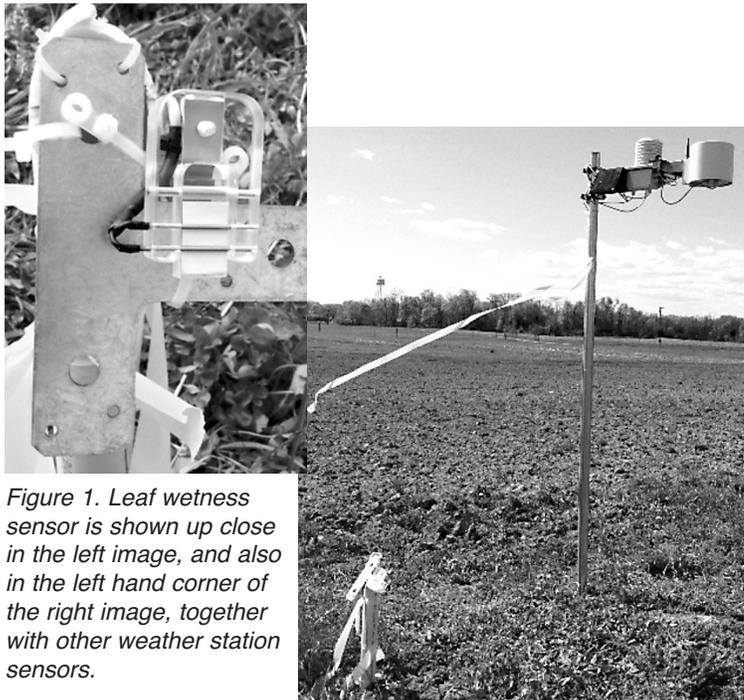


Figure 1. Leaf wetness sensor is shown up close in the left image, and also in the left hand corner of the right image, together with other weather station sensors.

(continued on page 30)

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## BERRY PRODUCTION

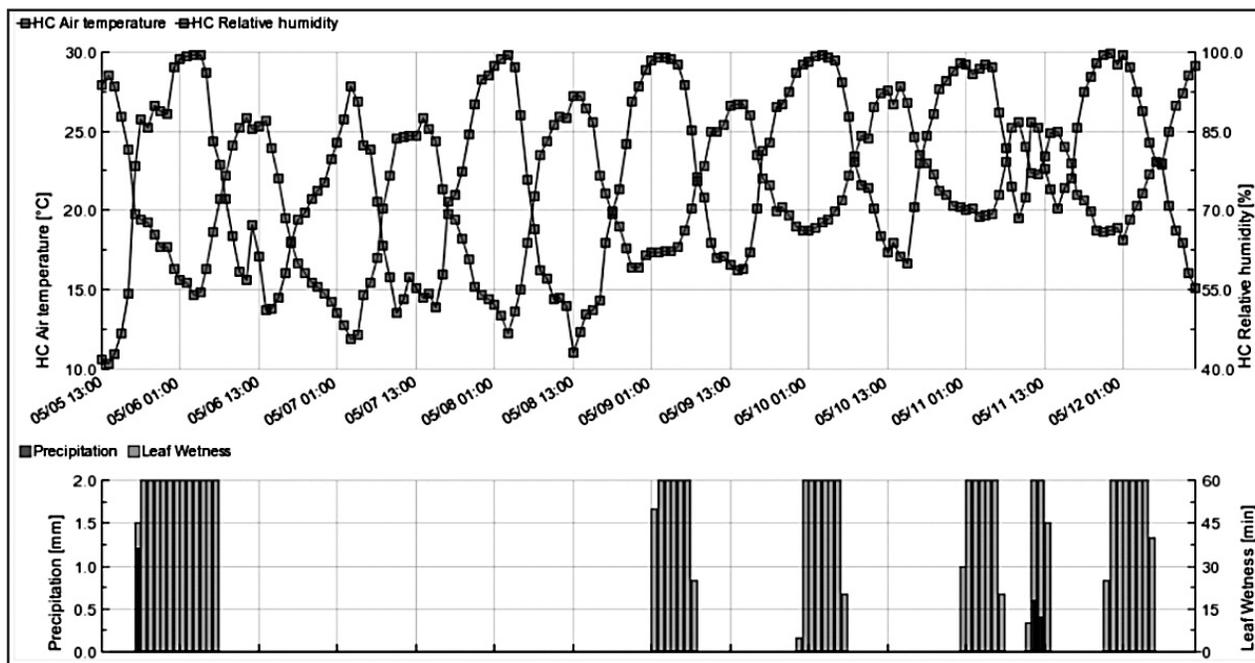
**Fruit Rots in the Rain...** (continued from page 29)

Figure 2. Weather station temperature, relative humidity (top) and leaf wetness hours and precipitation (bottom) at the WYE research site since the first major leaf wetness event. The date is shown between the two graphs.

Fruit rot pathogens, particularly our big “problem pathogens” in the region *Botrytis* and *Colletotrichum*, need at least 12 hours leaf wetness above 65° F for there to be a high risk of dispersal and infection. This is based on studies of both *Botrytis* and Anthracnose (*Colletotrichum*) fruit rot of strawberries, but can also apply to activity of these pathogens in many other fruit crops: *Botrytis cinerea* also causes ripe rot of peach, bunch rot in grapes, and grey mold in cane berries, blueberries and apples; *Colletotrichum* species also cause bitter rot in apples, ripe rot in grapes, and anthracnose in blueberry and peach.

Based on weather station data, we had only low risk events in both PA and MD up until mid-May, when several warm rains soaked the region, leading to two-three dispersal events, and likely more to come. This means that throughout the region, we are getting hit within or leading up to harvest of strawberries, and bloom time for many fruit crops—protection of these highly susceptible flowers and fruits are therefore critical.

We have included an example of the WYE weather station data in Figure 2. In the next couple of years we aim to establish a comprehensive weather station network across the region, accessible online or through your phone, to provide fruit rot risk assessment updates in real time, for strawberries and other applicable fruit crops.

With rain events comes the question: is it better to spray before or after it has rained? The conundrum: if you spray before, the plants are better protected but the product may wash off. If you spray after, the plants may get in infected before you can get in to spray, but you have the assurance that the product is present. So here's your take home message: it's harder to wash off chemicals that you might think. Although a lot gets washed off, what sticks around really sticks and still works great. It takes 1-2 inches to wash off enough fungicide to see a reduction in disease control, in Annemiek Schilder's studies at Michigan State.

Based on this the rule of thumb for “spraying in the rain” (also an unlikely future musical hit):

- (1) If you get less than 1 inch, keep using the normal interval;
- (2) If you get 1-2 inches, shorten the interval by half (eg. If you were going to spray 7 days later, spray 3-4 days later instead);
- (3) If you get more than 2 inches, spray as soon as you can re-enter the field.

This is based on recommendations for grapes (M. Nita) and small fruits (A. Schilder). For regular updates on fruit rot risk events associated with leaf wetness, you can also visit and / or Follow the Berry Pathology Twitter site at: [https://twitter.com/berry\\_pathology](https://twitter.com/berry_pathology). You can also follow this site, as well as the Penn State Pathology site (<https://twitter.com/drtreefruit>) for regular disease updates and timely resources for fruit crops throughout the season.

Dr. Swett is the grape and small fruit pathologist at the University of Maryland and Dr. Peter is with the Penn State Fruit Research and Extension Center.

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