



FDA Publishes Revisions to FSMA Rules

The federal Food and Drug Administration (FDA) has released its revisions to several rules it had previously proposed under the Food Safety Modernization Act (FSMA). The rules were originally proposed in January 2013 and were open for public comment until November 2013. The FDA received many comments from industry stakeholders, including PVGA, United Fresh Produce Association, American and Pennsylvania Farm Bureau, Pennsylvania Department of Agriculture, Pennsylvania Council of Farm Organizations, and Pennsylvania Association for Sustainable Agriculture (PASA).

While all the fine print will have to be reviewed, the following summaries from FDA indicate that they apparently responded favorably to many of concerns raised by PVGA and others, making the rules more flexible and less burdensome in key areas.

PVGA will be sending comments on the revisions to FDA. Any PVGA members who would like to be involved in the process of developing those comments should contact the Association at 717-694-3596 or pvga@pvga.org.

The FDA is accepting comments for 75 days after the publication date. The FDA published the original proposed rule on January 16, 2013, and the comment period closed on November 22, 2013; no additional comments are being accepted on the original proposed rule. The FDA will accept comments on the revised provisions while continuing to review comments already received on the original proposed rule. The comment period opens September 29, 2014.

Key Revisions to the Produce Rule

1. Water quality standard and testing more flexible

The FDA is proposing various revisions to the microbial standard for water that is directly applied during the growing of produce (other than sprouts). The agency is updating the microbial quality standard to reflect data that supports the 2012 Environmental Protection Agency recreational (swimming pool) water quality criteria.

Farmers with agricultural water that does not initially meet the proposed microbial standard would have additional means by which they could meet the standard and then be able to use the water. These options include establishing a sufficient interval of days between last irrigation and harvest to allow time for potentially dangerous microbes to die off. They could also apply an interval of days between harvest and the end of storage using appropriate microbial die-off or removal rates, provided there is adequate supporting data. And there is an option to calculate and apply appropriate pathogen removal rates for activities such as commercial washing.

A number of commenters felt that the FDA should allow for microbial die-off that occurs naturally in the field before the crop is harvested. This provision provides that flexibility. However,

any of these options would have to provide the same level of public health protection and not increase the likelihood that the covered produce will be adulterated.

Recognizing that water sources have different levels of contamination risk, the FDA is proposing a tiered and more targeted approach to testing each source of untreated water that will be less burdensome on farmers while still protective of public health. The revisions reduce how often the water is tested, with the frequency depending on the water source (i.e. surface or ground water) and on the results of prior tests.

2. Manure strategy to be further studied

The FDA is removing the nine-month proposed minimum-time interval between the application of untreated biological soil amendments of animal origin (including raw manure) and crop harvesting. The agency is deferring its decision on an appropriate

(continued on page 2)

Wanted: Pictures from Your Farm

To add interest and consumer education value to the PVGA Farm Show Food Booth, last year Nancy Grace was able to put together a slide presentation of scenes from Pennsylvania vegetable farms using pictures submitted by PVGA members. We would like to expand and improve that presentation that is displayed on a large screen for customers at the PVGA Booth.

But we need your help. Pictures from your farm of your crops and your planting, harvesting or packing operations as well as your market are needed. We could also potentially include video clips of your farm. So get out your camera and take a couple dozen pictures for PVGA during August and September. Then send them to us on a CD (PVGA, 815 Middle Road, Richfield, PA 17086) or by email (pvga@pvga.org). If you already have some pictures from earlier this summer or previous years, send them as well.



Rich Federkeil and grandson Colin pulling Pennsylvania Simply Sweet Onion at Level Crest Farm in Butler.

NEWS



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FDA Publishes... *(continued from page 1)*

ate time interval until it pursues certain actions. These include conducting a risk assessment and extensive research to strengthen scientific support for any future proposal, working with the U.S. Department of Agriculture and other stakeholders.

At this time, the FDA does not intend to take exception to farmers complying with the USDA's National Organic Program standards, which call for a 120-day interval between the application of raw manure for crops in contact with the soil and 90 days for crops not in contact with the soil.

The FDA is proposing to eliminate the previously proposed 45-day minimum application interval for compost (also known as humus), including composted manures. Properly treated and handled compost is safer than raw manure from a public health standpoint and this change to the proposal would help facilitate its use while still providing an appropriate level of public health protection.

3. Covered farms better defined

The FDA is proposing that farms or farm mixed-type facilities with an average annual monetary value of produce sales of \$25,000 or less will not be covered. The original proposed rule defined that monetary threshold in terms of all food sales. The FDA is also proposing corresponding changes to the definitions of "very small business" and "small business" to base those monetary thresholds on produce sales rather than food sales. The monetary threshold for the qualified exemption with modified requirements, however, would not change because that exemption is defined by statute.

The definition of "farm" would be revised; a farm would no longer be required to register as a food facility merely because it packs or holds raw agricultural commodities grown on another farm under a different ownership. The FDA is proposing that such activities would be subject to the produce safety rule rather than the preventive controls rule for human food.

4. Withdrawal of qualified exemptions process further clarified

The proposed revisions would establish procedures to guide the FDA in withdrawing an exemption for a farm for food safety reasons as specified in the proposed regulation:

The FDA may consider one or more other actions to protect public health prior to withdrawal, such as a warning letter, recall, administrative detention, or seizure and injunction.

The FDA must notify the farm of the circumstances that jeopardize the exemption, provide an opportunity for the farm to respond, and consider actions taken by the farm to address the issues raised by the agency.

The revisions also provide procedures for reinstating a withdrawn exemption.

5. Clarifying provisions on wild animals

The FDA states in the proposed revisions that the proposed produce regulation does not authorize or require farms to take actions that would constitute the "taking" of a threatened or endangered species in violation of the Endangered Species Act. There were concerns expressed that growers would interpret the original proposed rule in ways that would harm wildlife, including taking measures to exclude animals from outdoor growing areas or destroying animal habitats. This clarification is intended to relieve those concerns.

Produce Rule Compliance Dates

Very small businesses, those with more than \$25,000 but no more than \$250,000 in annual produce sales, would have four years after the rule's effective date to comply with most provisions.

Small businesses, those with more than \$250,000 but no more than \$500,000 in produce sales, would have three years after the rule's effective date to comply with most provisions.

All other farms would have two years after the effective date to comply with most provisions.

The compliance dates for water quality standards, and related testing and recordkeeping provisions would be an additional two years beyond the compliance dates for the rest of the final rule.

(continued on page 3)

The Pennsylvania Vegetable Growers News is the official monthly publication of the Pennsylvania Vegetable Growers Association, Inc., 815 Middle Road, Richfield, PA 17086-9205 phone and fax - 717-694-3596, email - pvga@pvga.org website - www.pvga.org

Our Mission:

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

Our Vision:

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

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

United's Washington Conference Brings Produce Leaders to Congress

About 500 leaders in the fresh produce industry from across the nation came to Washington, D.C. the second week of September to let members of the Congress know the industry's needs. The Washington Conference is the United Fresh Produce Association's annual event that allows members of the produce industry to cooperatively visit their state's federal legislators' offices. This year United focused on urging Congress to tackle the task of reforming the nation's immigration laws to provide legal agricultural laborers and to not back down on school lunch nutrition standards.

While the Senate has passed a comprehensive immigration reform bill, the House has failed to do so. While the Republican leadership has said they want to do immigration reform in package of separate bills, they have failed to pass a set of bills that address the numerous immigration issues. Rep. Joseph Pitts from Lancaster County stated he was prepared to vote for bills providing for many immigration reforms but was absolutely opposed to any provisions for amnesty for illegal immigrants in the country.

Pennsylvania Sen. Pat Toomey, who voted against the Senate immigration bill, indicated he supported immigration reform. One of the reasons he voted against the Senate bill was that he felt it did not have provisions to allow enough guest worker visas to meet the demand for legal workers – thus perpetuating the cycle of encouraging continued illegal immigration.

United also wanted to let members of Congress know that they did not support proposals on the table to exempt schools from providing at least one half-cup serving of fruits and vegetables at school lunches and breakfasts. Some schools have complained they are not able to feasibly meet this requirement enacted recently but 90% of schools have been able to meet



Pennsylvania produce industry members visit with Pennsylvania Senator Pat Toomey. Beginning in the foreground and going clockwise are: Lou Rotell and Ken Mobley from Earth Source Trading in Ephrata, Loretta Radanovic with Four Seasons Produce in Ephrata, Sen. Toomey, PVGA Executive Secretary Bill Troxell, Four Seasons Chairman David Hollinger and Nelson Longenecker, also with Four Seasons.

this standard. Given the childhood obesity crisis, the produce industry feels it is critical that children learn to eat – and learn to like to eat – fruits and vegetables. School meals are an ideal place to help children develop healthy diet patterns.

The Washington Conference educational sessions tackled many of the produce industry's biggest issues. The presentations from these sessions can be downloaded from at <http://www.unitedfresh.org/TWC/education>.

Session topics include:

- The GMO Debate and Impact on Fruits and Vegetables
- Can We Still Change Immigration Policy?
- The California Water Crisis: What's Next?
- International Trade and the Importance to Agriculture
- How Current and Pending Regulations Affect the Produce Supply Chain
- The Reshaping of America

FDA Publishes... (continued from page 2)

Key Revisions to the Preventative Control Rule

1. Farms that pack or hold food from other farms are not subject to the preventive controls rule

A farm would no longer be required to register as a food facility merely because it packs or holds raw agricultural commodities grown on another farm under a different ownership. FDA proposes to define such packing and holding as a traditional farming activity.

In general, on-farm packing and holding of produce would be subject to the proposed produce safety rule, not the human food preventive controls rule.

Farms that conduct additional processing or manufacturing may be subject to preventive controls rule for those activities.

2. Definition of a very small business proposed at less than \$1 million in sales

A "very small business" would be defined as firms having less than \$1 million in total annual sales of human food, adjusted for inflation. Previously, three options were proposed: annual sales of \$250,000, \$500,000, and \$1 million. The new proposed definition would exempt less than 1 percent of the dollar value of food produced in the United States.

3. Withdrawal of qualified exemptions process further clarified

The proposed revisions would establish procedures to

guide the FDA in withdrawing an exemption for a qualified facility for food safety reasons as specified in the proposed regulation:

The FDA first may consider alternatives to protect public health and would provide advance notification to the facility and an opportunity for the facility to respond. The revisions also provide procedures for re-instating a withdrawn exemption.

The FDA must provide an additional 60 days (for a total of 120 days) after the receipt of the order for a facility whose exemption is withdrawn to comply with the full requirements for hazard analysis and risk-based preventive controls.

4. Product testing, environmental monitoring, supplier controls proposed

While these potential provisions were referenced in the preamble of the proposed rule, they were not included in the regulatory text. The FDA is now providing an opportunity for input on specific language and seeking comment on whether to include it in the final rule. FDA is seeking comment on whether the preventive controls for human food should require:

A facility, as appropriate to the facility, the food, and the nature of the preventive control, to conduct product testing to verify implementation and effectiveness of preventive controls.

(continued on page 8)

NEWS

National News Briefs

FDA's Mike Taylor Advocates Cooperation with Industry for FSMA Enforcement

FDA will focus on a culture of cooperation, not simply enforcement, to bring companies into compliance with food safety standards, pledged FDA's Mike Taylor, Deputy Commissioner for Foods and Veterinary Medicine, at Wednesday's General Session Breakfast of The Washington Conference. Describing it as a "sea change," Taylor told United conference attendees that focusing on outcomes, rather than gathering evidence of violations, is part of a new operational mandate for advancing food safety at FDA.

"Historically we've had a tradition of enforcement at facilities, and it's important, but the shift we're undertaking is to understand that the purpose is not enforcement per se, but to get high rates of compliance with the standards," said Taylor. "We're really focusing on outcomes. We're looking at systems and how we can work with the vast majority of operators who want to produce safe food and to get compliance on a voluntary basis, and that's the outcome that matters. That's a fundamental reorientation of our approach to our oversight."

On enforcement, Taylor said FDA has no expectation that it will have the resources to do surveillance monitoring of farms like is done for facilities. Adding, "It doesn't mean we will never go on farms, but, as a practical matter, it's not in the cards for us." Instead, Taylor said FDA will rely on collaboration with state departments of agriculture for farm monitoring.

Taylor told United members that FDA is "very committed to the dual purpose of having the right food safety standards and achieving our food safety purpose" and that the standards should be "workable" and can be implemented successfully across the diversity of the industry.

On FDA's upcoming supplemental proposal on produce safety, as well as the proposals on preventive controls, Taylor predicted that the industry will see that FDA is making real progress toward achieving workable standards. "We will be addressing the water quality standard, the criteria of the testing regime, in a way that we build flexibility in this standard so that it can accommodate diverse conditions and the diverse way we can get to a safe product," said Taylor.

Late last year, FDA announced that it would propose revised rule language for key provisions of the Produce Rule, Preventive Controls Rule and Foreign Suppliers Rule. FDA's action was based on input from United Fresh and others asking for an additional round of proposed rules. The revised rule provisions have yet to be released.

FDA is under court-ordered deadlines for issuing final rules. The new deadlines are Aug. 30, 2015 for preventive controls for human food and preventive controls for animal food; October 31, 2015 for produce safety, foreign supplier verification program, and third-party accreditation; March 31, 2016 for sanitary transport, and May 31, 2016 for intentional adulteration.

"Don't be expecting an extension of the next comment period," Taylor told the audience. "I don't think it's feasible and we've got to stay on the work to get these things done. My boss is potentially held in contempt if we don't get those rules out, so we're going to get those rules out."

Taylor said that FDA is perhaps as much as four years away from actually enforcing any rules, but he said it's not too early to begin planning how FDA and the industry will be implementing the rules. Added Taylor, "We envision some public meetings on this sometime early next year, and we welcome whatever dialogue we can have with United Fresh about how we can implement these rules."

From Inside United Fresh, United Fresh Produce Association, September 12, 2014.

United Fresh Presents Congressional Leadership Award to Rep. Doc Hastings

United Fresh honored Rep. Doc Hastings (R-WA) with its Congressional Leadership Award during the Tuesday Breakfast General Session at The Washington Conference. United presented the award to Rep. Hastings for his work representing produce industry interests, including his service as co-chair of the House Specialty Crop Caucus and his leadership on immigration reform and multiple Farm Bills.

"Doc Hastings has been a steady advocate for the produce industry in Congress," said United Fresh Senior Vice President of Public Policy Robert Guenther. "With United's Congressional Leadership Award, we recognize Rep. Hastings' many years of work to represent the interests of the produce industry in his state and across the country. We need more like him on Capitol Hill."

Speaking to United's members at the session, Hastings addressed the legislation in the Senate and House of Representatives that aims to address the water crisis confronting California producers. "We are trying to work out the differences between the Senate and House bills. I can say that members of my staff at the House Natural Resources Committee and the California delegation have been working with Sen. Diane Feinstein's office to get a resolution," he said.

"I can tell you that progress is being made, and I sense there is a will to get something done. But resolution long-term is changing the Endangered Species Act," Hastings added.

Also at Tuesday's session, Sen. Pat Roberts (R-KS) offered updates on immigration reform, farm bill implementation and the need for staying active in Washington, DC. "I want to thank you for a great turnout at your policy conference," said Roberts. "It's terribly important that you are here and that you indicate that you are from specialty crop country. I think you want to tell members of Congress how they can help or, perhaps more importantly, how the government can simply get out of the way."

From Inside United Fresh, United Fresh Produce Association, September 12, 2014.

Dietary Guidance Panel Expected to Recommend Bold Action to Increase Produce Consumption

The 2015 Dietary Guidelines Advisory Committee (DGAC) will likely urge increased consumption of fruits and vegetables in upcoming recommendations for improving the diets of Americans. The United Fresh Produce Association participated as the DGAC met in Washington, DC. to discuss its draft conclusions and recommendations. Conclusions highlighted at the meeting: (1) consumption of fruits, vegetables, whole grains and dairy are well below recommended levels for good health and bold action is needed to increase fruit and vegetable consumption; (2) importance of improving children's dietary habits starting at very early age; (3) 75 percent of all adults are at high risk and need preventive intervention; and (4) recommendations will focus on individuals as well as policy, environmental and systems changes. Additionally, scientific evidence presented by the DGAC supported all of the new nutrition requirements currently being implemented to improve the healthfulness of school meals and foods/beverages sold in schools.

(continued on page 6)

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NEWS

National News Briefs *(continued from page 4)*

"The DGAC is in the final phases of developing its Advisory Report to the Secretaries of Agriculture and Health and Human Sciences due by the end of 2014," said Lorelei DiSogra, United Fresh vice president of nutrition and health. "I expect the 2015 Dietary Guidelines to include strong recommendations for increasing fruit and vegetable consumption and to emphasize why it's important to maintain strong school nutrition standards." The DGAC Advisory Report will provide the scientific basis for the 2015 Dietary Guidelines for Americans. The DGAC will have a final public meeting in late fall or early winter to discuss their Advisory Report and USDA and HHS will consider public comments. The 8th edition of the Dietary Guidelines for Americans is expected to be released in Fall of 2015. The Dietary Guidelines encourage Americans to eat a healthful diet that promotes health, prevents disease and achieves/maintains a healthy weight and are updated every 5 years.

Information about the DGAC, including video and slides from the public meetings can be found at: www.health.gov/dietaryguidelines/2015.asp

From *Inside United Fresh*, United Fresh Produce Association, September 18, 2014.

Retired Military Leaders Tell Congress "Retreat Is Not an Option" On Healthful School Foods

Underscoring their message delivered at The United Fresh Produce Association Washington Conference, more than 450 retired admirals and generals urged Congress a week later to not backtrack or delay updated nutrition standards for foods and beverages served and sold in schools. The report, "Retreat Is Not an Option", was released today by Mission: Readiness, a nonpartisan national security organization, with membership comprised of retired top military brass. It includes new and previously unreported state-by-state data from the Department of Defense showing the number of young adults thought to be too unhealthy to join the military. The report notes that obesity is the leading reason why more than 70 percent are ineligible in many states.

Key statistics include:

Obesity rates among active duty personnel rose 61 percent between 2002 and 2011.

Twelve percent of active duty service members are obese.

The military spends more than \$1.5 billion annually treating obesity-related health conditions and replacing those discharged because they are unfit.

More than 1 in 4 young adults ages 17 to 24 are too heavy to serve in the military.

One study of more than 2,000 men in a U.S. Army light-infantry brigade in Afghanistan found 14 percent were obese. The overweight and slower runners in the brigade were 1.5 times more likely to be injured than their healthier and fitter counterparts.

At the United Washington Conference, James A. "Jamie" Barnett, Jr., Rear Admiral, U.S. Navy (Retired), was joined by leaders from the National PTA and the American Heart Association in citing the critical need for good nutritional standards for America's school children. Adm. Barnett said the retired military leaders of Mission: Readiness regard the child obesity crisis to be a threat to national security.

A poll released by the Pew Charitable Trusts, Robert Wood Johnson Foundation, and American Heart Association found that 72 percent of parents nationwide favor updated nutrition standards for school meals and school snacks, while 91 percent favor requiring schools to serve fruits or vegetables with every meal.

The healthier meals standards—put in place following the enactment of the Healthy, Hunger-Free Kids Act of 2010—have been implemented successfully by more than 90 percent of school districts nationwide, according to USDA.

From *Inside United Fresh*, United Fresh Produce Association, September 18, 2014.

I-9 Video Available

On September 25, 2014, USCIS published the first Form I-9 Webinar On-Demand. Now you can watch the free Form I-9 webinar at any time online at <http://www.uscis.gov/i-9-central/form-i-9-webinar-deman-entire-video>. Choose the chapters of your choice or watch the entire 22 minute video in one sitting. You will see how to complete Sections 1, 2 and 3, best practices and much more. It's a great training tool.

Visit I-9 Central at <http://www.uscis.gov/i-9-central> to learn more and view other videos in the multi-media section.

Update to Harmonized Standards Now Official

Changes to the post-harvest operations Harmonized Food Safety Standards that were approved by the Produce GAPs Harmonization Initiative Technical Working Group (TWG) in March are now official. No comments or concerns were received since the proposed changes were posted in June. "While the changes are more for clarification than substantive, we know that the words matter," said David Gombas, senior vice president food safety and technology and coordinator for the Produce GAPs Harmonization Initiative. "Even subtle changes can affect an auditor's interpretation of what a produce operation is expected to do. The TWG agreed that these changes were important to avoid misunderstanding and potentially adding unnecessary expectations to an operation's audit."

The TWG also recommended that the Harmonized Standards be reassessed for what policies and procedures an operation should have written rather than verbal, and recommended that an official Spanish version of the standards be created. Working groups for both tasks will be convened soon.

From *Inside United Fresh*, United Fresh Produce Association, September 4, 2014.

New Report Shows Retail Incentives Increase Fruit and Vegetable Consumption

Results of the Healthy Incentive Pilot (HIP) published last week by USDA demonstrate the effectiveness of providing SNAP participants with an incentive of 30 cents for every dollar spent on targeted fruits and vegetables at participating retailers. The HIP study was conducted in Hampden County, Massachusetts between November 2011 and December 2012 with approximately 55,000 SNAP households.

"United Fresh [Produce Association] supports scaling up supermarket programs that provide financial incentives for low income families to purchase more fresh fruits and vegetables," said Dr. Lorelei DiSogra, United Fresh's Vice President of Nutrition and Health. "Produce incentives are an effective strategy to increase fruit and vegetable consumption and improve nutrition for families participating in the SNAP program and that evidence gained at retail will shape SNAP reform in the future," added Dr. DiSogra.

Key findings of the Healthy Incentive Pilot report: HIP participants consumed more targeted fruits and vegetables (F/V), especially dark green and red/orange vegetables. HIP participants spent more SNAP benefits on targeted F/V

(continued on page 7)

NEWS

National News Briefs (continued from page 6)

HIP households were more likely to have F/V available at home and to spend more on F/V than non-HIP households.

Most retailers did not find HIP difficult to operate

More than half of the retailers increased shelf space for F/V, received more F/V shipments from their suppliers and increased the frequency of restocking the display floor.

To see the entire report, visit <http://www.fns.usda.gov/healthy-incentives-pilot-final-evaluation-report>

From **Inside United Fresh**, *United Fresh Produce Association*, September 25, 2014.

Russia Bans Ag Imports

Russian officials recently announced a one-year ban on American agriculture imports. The impact will likely result in higher prices for Russian consumers, but little effect on U.S. agriculture, according to the American Farm Bureau Federation.

Russia imports about \$1.3 billion in American agriculture commodities, accounting for about 1 percent of total U.S. sales, said Veronica Nigh, an economist with AFBF.

"The bigger impact is on the Russian consumer," she said. "Russia imports about 40 percent of its food and we're predicting shortages and price hikes because the U.S. and the European Union have been the primary suppliers to the Russian market because we offer a wider variety of food at a lower cost."

The ban on U.S. and E.U. producers includes all meat, fish, dairy, fruits and vegetables. The U.S. poultry sector will see the largest hit, Nigh said.

From **Pennsylvania Agricultural Alliance Issues Updates**, *Penna. Farm Bureau*, September 2014.

Farm Bureau Argues EPA Violated Law in Data Release

The American Farm Bureau Federation argued recently in federal court the Environmental Protection Agency violated federal law when it released the personal information of farmers to activist groups.

Farm Bureau has sued the EPA after the agency released the personal information of thousands of farmers from 29 states in 2013. The EPA provided the information to three environmental groups that had filed a request under the Freedom of Information Act. The data included the names of farmers, along with home address, GPS coordinates, telephone numbers and emails.

"The EPA is displaying a callous disregard for basic privacy rights," AFBF President Bob Stallman said. "EPA believes that if information about you can be found somewhere on the Internet, or if you own a closely held family corporation, you have no interest in protecting your personal information. All citizens should be worried about that, not just farmers and ranchers."

In its court filings, AFBF argues federal law prevents agencies from releasing personal information when complying with a Freedom of Information Act request. EPA has agreed not to release more information pending the court's decision on this lawsuit.

From **Pennsylvania Agricultural Alliance Issues Updates**, *Penna. Farm Bureau*, September 2014.

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NEWS

State News Briefs

Pension Plan Could Save \$24.5 Billion

A pension reform proposal floated by Rep. Glen Grell would cut employer contributions by \$24.5 billion over the next 30 years, with the savings coming through a series of bonds.

Actuaries for the Pennsylvania Public Retirement Commission (PERC) reviewed Grell's proposal and found the state could save on its pension obligation by issuing \$9 billion in pension obligation bonds, the Pittsburgh Post-Gazette reported. Grell said he was pleased the analysis by PERC confirmed that his plan will result in savings.

"The analysis confirmed much of what I have been saying about the effect of a comprehensive proposal to address the unfunded liabilities of our two statewide pension plans," he said.

Last year, Grell introduced a three-phased approach to solving the state's pension problem, including the issuing of bonds to make up a portion of an estimated \$50 billion shortfall in the system. Pennsylvania's two public employee pensions—one for state workers the other for school employees—are underfunded due to several factors including poor market performance.

From Pennsylvania Agricultural Alliance Issues Updates, Penna. Farm Bureau, September 2014.

Agriculture Data Brings Risk, Rewards

In the late 1990s, Dean James began using yield map data on a farm he manages in Northumberland County.

One of the questions leveled at the time was what he was going to do with that information.

Now, more than a decade later, that information has become part of a larger collection of data that guides James' decision as he manages grain operations on the farm. James, who is farm manager for Cotner Farms, uses agriculture data to break down his fields into management zones, knowing how each performs in terms of profitability. James also knows how

much pesticide or soil amendments were applied to those fields, thanks to technology.

"When we look down the road, we know we will have to manage by the acre," James said.

James discussed how Cotner Farms utilizes agriculture technology during a forum held at Ag Progress Days to focus on the emerging issue of ag data.

Pennsylvania Farm Bureau President Carl T. Shaffer, who also participated in the forum, said he's a supporter of technology and research that helps farmers improve. However, Farm Bureau has several questions around agriculture data, specifically who owns farmer-generated data and what risks arise when that data is shared, Shaffer said. For instance, if real-time harvest data is collected from a number of combines across the country, could that data be used to manipulate market conditions, Shaffer said. Or, consider a scenario where the Environmental Protection Agency or another regulator obtained manure or pesticide application rates.

Farm Bureau has been proactive on this issue, meeting with seed dealers and equipment companies to discuss how to protect farmer-generated data, Shaffer said. Farm Bureau's position is that farmers own the data that they generate, however farmers need to pay close attention to any contracts or privacy statements.

"We want to get these issues resolved now, before they become a larger issue," he said.

In terms of protecting a farmer's rights when it comes to agriculture data, farmers have more flexibility when it comes to a contract, as opposed to privacy statements, said Ross Pifer, director of the Agriculture Law Resource and Reference Center at Penn State, who participated in the forum. Company privacy statements may cover how they deal with data, and how it is disseminated, but those documents can be changed, Pifer said.

(continued on page 9)

FDA Publishes... *(continued from page 3)*

A facility, as appropriate to the facility, the food, and the nature of the preventive control, to conduct environmental monitoring to verify implementation and effectiveness of preventive controls if contamination of a ready-to-eat food with an environmental pathogen is a significant hazard.

Supplier controls are proposed when the receiving facility's hazard analysis identifies a significant hazard for a raw material or ingredient, and that hazard is controlled before the facility receives the raw material or ingredient from a supplier.

If these provisions were to be included, the facility would have flexibility to determine the appropriate verification activity (such as onsite audit, sampling and testing) unless there is reasonable probability that exposure to the hazard will result in serious adverse health consequences or death to humans.

In that instance, an annual onsite audit of the supplier would be required unless the facility can show that other verification activities and/or less frequent onsite auditing of the supplier provide adequate assurance that the hazards are controlled.

5. Economically motivated adulteration language proposed

The FDA is asking for input on whether a facility should be required to address hazards that may be intentionally introduced for purposes of economic gain as part of its hazard analysis.

Preventative Controls Compliance Dates

Small businesses—a business that employs fewer than 500 persons and that does not qualify for an exemption would have to comply two years after publication of the final rule.

Very Small Businesses—defined as having less than \$1 million in total annual sales of human food, adjusted for inflation, would have three years after publication of the final rule to comply. Considered "qualified facilities," they would be subject to modified preventive control requirements.

Other Businesses—a business that is not small or very small and does not qualify for an exemption would have to comply one year after publication of the final rule.

Animal Feed Rule Revisions

The Preventive Controls for Animal Feed now clarifies that human food by-products (e.g., culls and produce waste from fresh and fresh-cut produce operations) are not required to establish food safety plans for such products if intended for animal feed, but must abide by basic GMPs to prevent such products from becoming contaminated (e.g., by chemicals and trash).

Most of this article is from FDA announcements. The last paragraph is from Inside United Fresh, United Fresh Produce Association, September 25, 2014.

State News Briefs *(continued from page 8)*

A contract signed by the company and the farmer cannot be changed, and a farmer can seek legal remedies if the contract is broken, he said.

These are issues that need to be looked at and considered as the development of technology gives producers much more information at their fingertips said. Taylor Doebler, manager of T.A. Seeds, who participated in the forum. In recent years, companies have been offering to analyze data that used to be kept in a small notebook or computer spreadsheet, he said.

“My concern is I don’t think some producers understand what the agreements and privacy statements mean,” he said.

At the same time, data cannot completely replace the knowledge acquired by farmers and seed dealers who have a firm grasp of location conditions, like rainfall or soil types, James said. When it comes to having a third-party company aggregate his farm data, James said he’s taking a wait-and-see approach.

“We are going to keep our data close to home until we see more cards on the table,” he said.

From Pennsylvania Agricultural Alliance Issues Updates, Penna. Farm Bureau, September 2014.

PDA Regional Office Moves

The Pennsylvania Department of Agriculture has relocated a regional office to 403 E. Christiana Street, Martinsburg, Blair County, from Altoona.

The department provides regulatory inspections at farms, agribusiness and other businesses. Regional offices are staffed by plant inspectors, dog wardens, regional veterinarians,

weights and measures inspectors and others.

“Our new Martinsburg location will give our field staff easier access to our regional office as they inspect operations in Morrisons Cove and other rich farming areas of central Pennsylvania,” said Agriculture Secretary George Greig. “The move was carefully considered and will improve the services provided by our department.”

Field staff in the Martinsburg office serve Bedford, Blair, Cambria, Centre, Clearfield, Fulton, Huntingdon, Juniata, Mifflin and Somerset counties.

From Pennsylvania Agricultural Alliance Issues Updates, Penna. Farm Bureau, September 2014.

Wood Quarantine in Place

Five southeastern Pennsylvania counties are under a quarantine order because of Thousands Cankers Disease. The disease was found on black walnut trees in Chester County. The quarantine restricts the movement of wood and wood products from Bucks, Chester, Delaware, Montgomery and Philadelphia counties.

The disease is caused by the walnut twig beetle, which carries a fungus as it tunnels into the bark of walnut trees. The fungus causes cankers to form, causing tree death within 10 years in infestation. Black walnut is highly-sought after hardwood, used in woodworking and furniture making. The quarantine restricts movement of all walnut material, and all hardwood firewood.

From Pennsylvania Agricultural Alliance Issues Updates, Penna. Farm Bureau, September 2014.



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NEWS

Penn State Farm Executive Workshop Set for January 13 and 14

Everything we have previously learned about economics and business management must be applied on our farms. From conversations with farmers we believe this is the challenge for today's farm managers and leaders. The difference in profitability of the top 20% and the bottom 20% of commercial farms continues to grow every year. Even the best and most successful farm businesses have issues.

"The future will always belong to those who see the possibilities before they become obvious." Danny Klinefelter

Penn State Extension recognizes that it is necessary to grow your knowledge and understanding of the dynamic management issues impacting the long term viability of your commercial farm. Skills required to adequately address the challenges of incorporating technological and regulatory change, analyzing market shifts, managing personnel and using appropriate fiscal oversight are increasingly complex in any business.

Join us January 13 to 14, 2015, at the Penn Stater Hotel and Conference Center in State College for the Penn State Extension Farm Executive Workshop where you can enhance your management and leadership capacity as you strive to ensure the success of your business.

Most of the farm management education opportunities we have been exposed to teach us what to do. The purpose of this workshop is to broaden our understanding of how to implement what we know we should do. Gaining a sense of being on the right track, along with opportunities for follow-up add to the value of this unique learning event.

This workshop will sharpen your decision-making, leadership and management abilities through small group discussions, interactive sessions and engagement with world class industry professionals. The program curriculum includes a selection of agricultural management topics specifically chosen to address the needs of mid-Atlantic and north east agricultural business executives. As we work towards an ideal solution to the issues in our individual businesses; we grow our management and leadership skills. The concept is to stop treating the symptoms and start fixing the problem.

The Penn State Extension Farm Executive Workshop will provide:

- Discussion and exploration of key business management challenges
- Opportunity to build on your understanding of core business management functions
- Networking with peers from across our region
- Discussion and exploration of industry issues with leading thinkers and researchers
- Enhancement of your ability to lead and manage your business

All sessions emphasize practical insights and practices that grow your capacity to implement classic business management processes. The year's workshop sessions focus on:

- Enterprise Budget Use and Analysis
- Thinking and Acting Strategically
- Global Perspectives and Ag Policy Implications
- The Transition from Laborer to Manager to Leader
- Financial Statements: What can you do for me?
- Accountability in Family Businesses

We do not offer a guarantee of success. However, we are confident your active participation in this workshop will increase your appreciation of alternative perspectives and build an understanding of the importance of including appropriate concepts in your farm management conversations.

If you understand that you do not manage a farm, but that you manage a farm business – this workshop is for you.

"The only truly sustainable competitive advantage is the ability to learn and adapt faster than your competition." Jack Welsh

The Penn State Extension Farm Executive Workshop is one component of a unique, full-featured learning opportunity. In addition to the two days of sessions in January, you have the chance to participate in an on-farm problem solving experience, and the opportunity to join a regional farm management peer discussion group. This full package is available for those farm managers and leaders that appreciate life-long learning.

For additional information contact John Berry, 610-391-9840, johnberry@psu.edu. Registration opens October 15.



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Vine Crops School Planned for November 4

This school covers everything you wanted to know about vine crop production in one intensive day. Topics include: basics of production, variety performance, disease, insect, fertility, and weed management considerations for organic production, and marketing pointers.

You'll get the opportunity to hear from and ask questions of the most knowledgeable specialists in growing vine crops. Whether you already grow cucumbers, melons, or various squash's or are new to producing these crops, this school is the place to sharpen your skills before the 2015 growing season.

Program Topics:

- Understanding and preventing abiotic disorders in vinecrops
- Watermelon varieties
- Managing weeds in your vinecrop fields
- Managing insects and mites in vinecrops
- Growing cucumbers in high tunnels
- Specialty Melons for Direct Marketers
- Recognizing and Managing Diseases in vinecrops
- Virus transmissions in pumpkins

Whether you already grow cucumbers, melons, or various squash's, or are new to producing these crops, this school is the place to sharpen your skills before the 2015 growing season.

Registration cost is \$75 and includes all program materials, snacks, and lunch. A CD/DVD of all PowerPoints and handouts will be sent after the meeting to each participant. Pesticide credits will be awarded to licensed applicators.

The School will be held at the Lancaster Farm and Home Center, 1383 Arcadia Road, Lancaster from 8:00 a.m. to 4:00 p.m. To register go to <http://extension.psu.edu/vinecrop-growers> or call 717-240-6500.

Introduction to Organic Veg Production Workshops Set

Crop Planning for Diverse Rotations

When: October 28, 2014 5:30 PM - 8:30 PM

Where: Lehigh County Agricultural Center, 4184 Dorney Park Rd, Allentown, PA 18104

Join Penn State Extension October 28, 2014 for an intensive introduction to crop planning with spreadsheets.

Farming on paper during the winter is a great way to be more efficient during the growing season. Tianna DuPont, Penn State Extension will introduce you to a refined crop planning and record keeping system developed by a farmer friend in Oregon. The crop planning system presented will let you plan out hundreds of separate plantings. This workshop will use excel style spreadsheets extensively and cover shortcuts and techniques for using spreadsheets more effectively and efficiently. Learn to connect your seed order, greenhouse seeding schedules, direct seeding and transplanting schedules and bed preparation schedule to a customized master sheet with your crop information. For those setting up intensive, spreadsheet based crop plans for the first time or wanting to streamline existing systems.

This workshop will also introduce you to a variety of additional crop planning resources.

Bring your laptop to follow along if you would like to follow along. Participants will receive digital spreadsheet examples.

No pre-registration is necessary. Location 4184 Dorney Park Rd, Allentown, PA 18104. Walk-in fee is \$15 (\$5 for apprentices). For more information visit extension.psu.edu/start-farming or call Tianna DuPont (610) 746-1970.

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MARKETING

Marketing News Briefs

Mobile Grocery Stores

In the article "Mobile Grocery Stores May Soon Bring Veggies to Food Deserts" (see <http://www.startribune.com/local/blogs/259137421.html>) published this month in the Star Tribune of Minneapolis, Minnesota, mobile grocery stores will soon be legal in Minneapolis. The main focus of these grocery trucks will be to visit food deserts and offer fresh foods. According to the article, the new law requires that mobile stores "must offer at least 50 items of fruits or vegetables in at least 7 varieties. No more than 50% of the selection may be one variety of fruit or vegetable". One group, CityKid Enterprises, has proposed a farmers market-type truck that would focus on underserved areas. The truck would accept food stamps and would include a nutrition educator to guide customers in choosing healthy foods.

This mobile grocery store concept is one example of a way for ethnic greens and herbs [and vegetable] growers to market their products. Of course, it is important to do your research before starting any new addition to your marketing plan. Your analysis should include market demand and local laws.

*From the **Ethnic Greens and Herbs Workshop Newsletter**, Penn State Univ., No. 14, June 6, 2014.*

Demand Growing for Farmers Markets

New data collected by the U.S. Department of Agriculture shows consumer demand for farmers markets is growing. The recently released National Farmers Market Directory shows there are 8,268 farmers markets across the country, an increase of 76 percent since 2008. USDA data has found the growing demand for farmers markets is growing in every region of the country.

"The National Farmers Market Directory numbers reflect the continued importance of farmers markets to American agriculture. Since its inception, the directory has proven to be a valuable tool for accessing up-to-date information about local farmers markets," said Anne Alonzo, Agricultural Marketing Service administrator. "Farmers markets play an extremely important role for both farmers and consumers. They bring urban and rural communities together while creating economic growth and increasing access to fresh, healthy foods."

For more information about farmers markets visit: farmers-markets.usda.gov.

*From **Pennsylvania Agricultural Alliance Issues Updates**, Penna. Farm Bureau, September 2014.*

Fresh Produce Incentives that Drive Retail Sales

A recent segment on NBC News featured the exciting work being done throughout Michigan to increase produce consumption among low-income families using incentives called Double Up Food Bucks (DUFb). When low-income families spend \$10 in SNAP (food stamp) benefits on fruits and vegetables at a participating grocery store or farmers' market they receives an

additional \$10 of DUFb to purchase Michigan-grown fruits and vegetables. This is a win for low-income families, who can double their produce purchasing power and increase their consumption of healthful fresh fruits and vegetables, and a win for retailers and growers

SpartanNash, a national food distributor and grocery chain headquartered in Michigan, started offering DUFb to their SNAP customers in Battle Creek, Grand Rapids and Detroit on August 1 as part of a four-month pilot. With the goal of increasing produce sales and consumption, the results of the SpartanNash pilot could pave the way for retailers across the country to drive increased produce sales to customers who use food assistance dollars. Spartan Nash partnered with Fair Food Network (FFN), a Michigan non-profit organization, to launch the DUFb pilot. "Moving Double Up into groceries across the state means we will reach more low-income families and help more Michigan farmers sell more produce to their neighbors," said Oran Hesterman, FFN's President.

"SpartanNash will be a model for other grocery chains interested in implementing SNAP produce incentives to grow produce sales and help low-income customers access healthier foods. USDA is expected to release information very soon on how retailers across the country can participate in programs like DUFb with \$100 million in federal funding provided by the 2014 Farm Bill. Details about how to apply for a Food Insecurity Nutrition Incentive (FINI) grant, a new program that will support communities to launch and expand programs like DUFb, is expected very soon," said Lorelei DiSogra, United Fresh's VP for Nutrition and Health.

Check out the new Double Up Food Bucks 5 Year Report at fairfoodnetwork.org for additional information about DUFb and Fair Food Network's model for increasing produce purchases and consumption thru DUFb produce incentives.

*From **Inside United Fresh**, United Fresh Produce Association, August 28, 2014.*

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Report Ecological Pesticide Incidents to National Pesticide Information Center

Emelie Swackhamer

People are concerned about the effect pesticides have on wildlife and the environment. Specifically, there is a lot of discussion about the role pesticides play in the decline of pollinators; both honeybees and wild insects.

Penn State has a world-class group of researchers looking at this complex problem, and they are collaborating with other experts on a national and international level, but they need your help.

To focus their efforts, researchers and regulators need to know about real-world experiences with pesticides and pollinators. How can you get your anonymous observations and concerns to the researchers? Send them to the National Pesticide Information Center (NPIC) at <http://npic.orst.edu/>.

NPIC is a cooperative effort between Oregon State University and the U.S. Environmental Protection Agency. NPIC provides a factual source of information on pesticide-related issues. They are accessible at <http://npic.orst.edu/> or via telephone at 800-858-7378 Monday-Friday between 8:00 a.m. and 12:00 noon Pacific Standard Time. You can get a lot of other useful information from NPIC, including fact sheets on the ingredients in the pesticides you use and great safety information. Check NPIC out and bookmark the site or call them up.

To report your observations about the impact of pesticides on pollinators, wildlife or the environment, go to the NPIC Ecological Pesticide Incident Reporting site at <http://pi.ace.orst.edu/erep/> and click "submit a report," answer the questions, and then save your work. By knowing more about the problems

that are occurring in the field, the researchers can target their investigations to try to find practical ways to help our pollinators, producers, and gardeners. The stories and information you provide to NPIC is strictly anonymous; they don't ask for any information that would personally identify you.

Protecting pollinators and the environment is everyone's responsibility. If you have knowledge that will contribute to the effort, consider sharing it through National Pesticide Information Center.

*Ms. Swackhamer is with Penn State Extension in Lehigh County. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, July 15, 2014.*



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GENERAL

Farm Food Safety Notes

Wesley Kline and Meredith Melendz

Know the Contents of Your Food Safety Manual

If a grower hires someone to write his or her food safety manual, the grower must know what is in the manual and adhere to the contents! There have been instances when the auditors came to do the audit, it was obvious the grower did not know what was in their own farm food safety manual.



Sit down with the person developing the manual to make sure there is agreement about what to put in the manual.

Once the manual has been developed, review each section to clarify and make necessary changes for the final version.

Remember, auditors use the grower's food safety manual as the basis for the audit. If the grower does not know and understand the contents of their manual, they won't be able to answer the auditors' questions.

From the Plant and Pest Advisory, Rutgers Coop. Extension, <http://plant-pest-advisory.rutgers.edu/audit-ready-on-farm-food-safety-lessons-learned-series/>, June 17, 2014.

Worker Break Areas

The USDA GAPs and USDA Harmonized Third Party audits require that worker break areas be separate from where saleable product is handled.

The GAPs audit states "smoking and eating are confined to designated areas separate from where product is handled." An auditor completing a GAPs audit will look to see that the break area is indeed separate from production areas and that workers are using the area as they should be. If personal items, such as lunch boxes, food items etc., are found in the production area the auditor will deduct points from the total GAPs audit score. In some cases the auditor may deem the risk of contamination too great and may stop the audit.

The Harmonized audit goes a bit further to state "Operation shall have policy prohibiting smoking, eating, chewing gum or tobacco, drinking other than water except in designated areas. Such areas shall be designated so as not to provide a source of contamination." An auditor conducting a harmonized audit will look for a written policy within the farm food safety plan stating that smoking, eating, chewing gum or tobacco and drinking other than water will take place in the designated areas. The policy should state where each of these designated areas are and how the areas are to be used. The auditor will then look at these designated areas to determine if they are being used in accordance to the farm policy. If the auditor finds a discrepancy in the policy or does not agree with the policy he or she can indicate that a corrective action is need-



ed. Should the auditor find a serious concern for contamination he or she can stop the audit. This policy will be specific to the farm it is written for and should be detailed enough that workers will understand what activities are permitted at various locations at the farm. Each of the designated location should be marked with signage so it is obvious as to where the smoking and eating areas are.



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Farmers Couldn't Do Their Jobs Without Modern Machinery

It has been said that the conquest of hunger began with the invention of the plow. One of the most important things farmers own is farm machinery, especially their tractors. Virtually every phase of mechanized agriculture depends on tractor power. The word tractor was not generally known until it appeared in a manufacturer's advertisement in 1906 as a shortened version of "gasoline traction engine."

Today's tractors have come a long way, and their importance hasn't diminished. In fact, modern-day tractors have added technological features that enable farmers to work their land more efficiently.

Many farmers use GPS technology to help them plant and fertilize crops. They can pinpoint exactly which areas of a field need water or fertilizer, and then they can program the equipment to treat those portions of the field exclusively. This enables farmers to be better stewards of the land, using a minimal amount of applications on their crops instead of treating an entire parcel of land.

Tractors are the workhorses of the farm. They are used for towing equipment such as hay mowers, balers, wagons, plows and forage harvesters. Tractors also are designed to power other equipment through a rotating power take off shaft (PTO.) Equipment like hay balers receive their power through the tractor's PTO. Most farmers have multiple tractors that they use for different tasks. Newer models with air-conditioned cabs and satellite technology are used for major field work. But older tractors often are used to transport wagons between fields and barns.

Farm equipment does not come cheap. Tractors — depending on their size — often cost hundreds of thousands of dollars. For example, combines used to harvest grain crops typically sell for as much as \$400,000. A field cultivator, which mixes soil and helps kill weeds while still leaving plant material on the ground to prevent soil erosion, can easily run in excess of \$30,000 to purchase.

The risks of modern food production make me glad we have a dedicated bunch of farmers willing and able to feed

themselves, me, and several others across our world. We are truly fortunate for the food access and food safety we all enjoy.

Food production has certainly come a long way!

10,000 B.C.

Farming and the domestication of animals leads to the change from hunter-gatherer societies to the development of the first permanent civilizations along the Tigris and Euphrates rivers in what is now Iraq.

1701

Jethro Tull introduces the seed drill allowing more efficient planting of cereal crops.

1834

The McCormick mechanical reaper is patented, allowing farmers to harvest grain more efficiently.

1862-1875

This time frame encompasses the change from hand-power to horse-power and represents the first American agricultural revolution.

1940

One farmer, on average, produces enough food for about 11 people.

1945-1970

In this time frame the change from horses to tractors and expanded technology characterize the second American agricultural revolution.

1954

The number of tractors on farms exceeds the number of horses and mules for the first time.

1970

One farmer, on average, produces enough food to feed 48 people.

2014

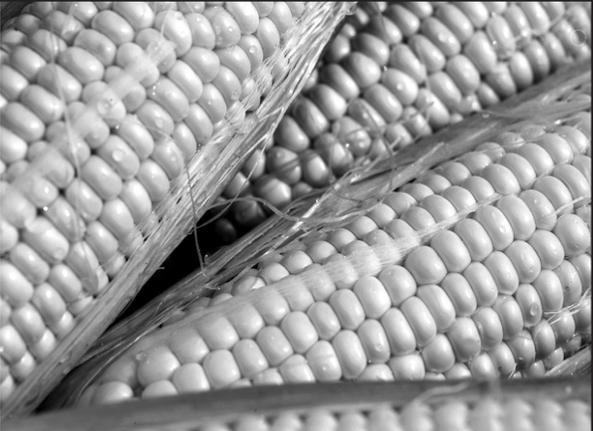
One farmer, on average, produces enough food for about 155 people.

Information for this article came from the Virginia Farm Bureau, Agriculture in the Classroom materials.



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GENERAL

“Are You Crazy?” Tour Successful

John Berry

On July 22 and 23 PVGA, Penn State Extension and USDA-RMA sponsored the 18th annual “Are You Crazy?” retail farm market and agritourism bus tour. This year’s event explored premiere markets throughout central Maryland. Additionally, this year the Tour had sponsorship from Martin’s Produce Supplies, Putnam Plastics Farm Products, Rockford Package Supply, Maize Quest Fun Park, Jay R. Bustard Advertising, and Produce Promotions.

The Tour enjoyed wonderful weather as we picked up participants in Allentown, Lancaster and

Gettysburg. The bus was a sell-out with marketers from Connecticut, Maryland, Maryland, New Jersey, and New York as well as Pennsylvania taking advantage of this excellent opportunity to learn, share and get two days away.

Our first stop was Catoctin Mountain Orchard. Catoctin Mountain Orchard is a four-generation farm with a diversified orchard operation growing fruit, berries, and vegetables on 125 acres. Each year they plant new

variety test trees looking for the best tasting fruit! A half-acre of kiwi berries are their newest venture. They offer fruit, vegetables, a bakery, pick-your-own fruit, cut-your-own flowers, farm market, and farm tours. Some of the things we liked best here included product diversity, creativity, Bob’s honesty, the view, quality fruit at affordable prices, and their educational focus.

We next traveled to Baugher Farm Orchard Market. Celebrating over 100 years in Carroll County, Baugher’s Orchard has been a working fruit and vegetable farm since 1904. This 600-acre operation is one of the largest orchards in Maryland. Their operation includes a family restaurant, two markets, pick-your-own, a bakery, their own apple cider, a fall pumpkin patch and hayrides, playgrounds, and a petting zoo. In October they employ 130 people and serve up to 5,000 visitors each day for this busy season. Noted as especially impressive at this market were the stories about their crowd management, big displays, the Canning Corner, pictures of family & farm throughout markets & restaurant, using upright pallets for display, and their signs not only list product but describe ripeness & how to eat. Fortunately for Tour planners, Baugher’s Restaurant was able to feed us a great lunch as the next stop for the first day of touring.



McCutcheon’s Apple Products, Inc. was the stop following lunch. McCutcheon’s Apple Products is a four-generation family owned company geared toward serving small businesses. They produce all natural gourmet fruit preserves and butters, jellies, juices, condiments, sodas, and much more. Most of the

Tour participants carried McCutcheon products and were quite interested in seeing how the manufacturing, distribution and marketing process goes. Bob and family did a great job of showing us around and answering all our questions as we got a behind the scenes tour.

Next we traveled to Butler’s Orchard. Butler’s Orchard is a family farm providing good green fun and local produce for over 60 years. They operate a farm market, pick-your-own, bakery, field trips and events such as group hayrides and bonfires, strawberry blossom tours, group pick-your-own outings, Bunnyland, and Pumpkin Harvest

Days. One item we were especially interested in at this market was their process for a significant Pick-Your-Own that also strives to reduce theft, while improving the customer experience. Some of the features we noted here included the great

festival area, separate sections to spread out p-y-o crowds, great roadside appearance, very clean, and the creative use of black board signs

On day two we started the Tour at Larriland Farm. Larriland Farm is family owned and operated with a wide open farm market, but they are recognized as a pick-your-own farming operation which started in 1973. They grow tart and sweet cherries, strawberries, thornless blackberries, black, red, and purple raspberries, blueberries, peaches, apples, and vegetables including spinach, tomatoes, beets, broccoli, and pumpkins. Features of this market stop of special inter-



est included the beautiful market in rebuilt barn, display items and tables are on wheels, nice signage in the market and field, directional signage in fields, mobile checkout stands in fields looked efficient and sturdy, signage leading up to market (no dogs, how to get to various places), and the planning it takes to keep U-pick produce available daily.

(continued on page 17)

GENERAL

“Are You Crazy?”... (continued from page 16)

For the second stop on day two of this year's Tour we traveled to the Weber Cider Mill Farm. Since 1908, over four generations of the Weber family have been market gardeners and fruit growers. Weber's Cider Mill Farm is Maryland's oldest cider mill in continuous use. Their farm includes a farm market, bakery, and gift shop. The farm market features summer fruits and vegetables, including 45 varieties of peaches and continues into fall harvest with over 20 varieties of apples, their own cider, and fall fruits and vegetables. The bakery produces over 20 different types of pies, cider donuts, hand-dipped ice cream, fudge, apple cider, and fruit slush. Their gift shop offers baskets, children's books, soy candles, and home décor. Some of the things we saw that impressed us the most here were how beautiful and clean inside the market was, loved the antiques, peach shaped signs with peach information, how the bakery extended out onto the store floor - very hard to miss, employees were SUPER friendly, and the viewing window for apple cider pressing.

By now it was time for lunch as we traveled to Richardson Farms of White Marsh. There are three generations of the Richardson family involved in the day-to-day operations. Not only have they managed the largest farm stand in the Northeast Market in Baltimore since 1930, in 2010 the new On-Farm Market was opened. Under the supervision of their Executive Chef, the kitchen and deli prepares whole, carryout meals, or your choice of delicious food items such as rotisserie chickens, slow-smoked barbeque, cheese, deli meats, fantastic desserts, and more. Richardson Farms grows more than 300 acres of fresh produce and provides locally grown fresh vegetables to area wholesalers. Of particular interest here was “Chefing” and how to incorporate foods from the farm into restaurant menus. Some of what was noted on this stop's evaluations included how we love the structure with a great layout, impressive food prep vision, great to see a business tapping into the farm to table trend, good looking produce displays, and a delicious lunch by an enthusiastic chef with great ideas.

For the final market visit for this year's Tour we were at Milburn Orchards. Family owned and operated since 1902 Milburn Orchards is now run by the fourth generation of the Milburn family. Milburn Orchards provides families with high quality farm fresh fruits and vegetables, available in their farm market or wholesale. Two years ago they built an addition onto the original building, which more than doubled the size of the market. We have been fortunate to include Milburn's on previous Tours and were especially excited to see their new facility. Features we were especially impressed with include the new cash register area that adds a lot more space, the new items to the “barnyard” area including a spider web, rocking chair, trucks, ground hog hill, the large kitchen space with plenty of room to work and prep, in general a very neat farm market, all the activities for the families were very interesting, and the back door loading for donut displays.

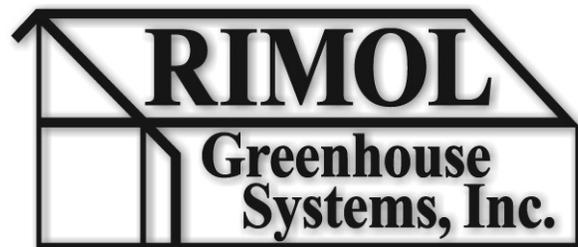


All Tour hosts and participants value the experiences we had during this 18th annual event. We all appreciate the support provided by PVGA and all the other sponsors.

Mr. Berry is with Penn State Extension in Lehigh County.

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GENERAL

On the Road... Mock's Greenhouse and Farm

Elsa Sanchez, William Lamont and Thomas Ford

Mock's Greenhouse and Farm has facilities in Berkeley Springs, West Virginia and in Winber, Pennsylvania. On July 23, 2014 farmer Paul Mock gave us a tour of the 60,000 ft² of hydroponic production in Berkeley Springs.

Lettuce, upland cress (*Barbarea verna*) and various herbs including basil and cilantro grow in NFT (nutrient film technique) channels. Crops of varying development stages grow in a single greenhouse to manage the risk of an entire crop being unsalable at harvest.



Upland cress growing in a channel system purchased used.



Lettuce at varying developmental stages growing in a NFT system.

Another risk management strategy used is keeping extra equipment such as fan motors and distribution pumps on hand for quick repairs in the event of malfunction.

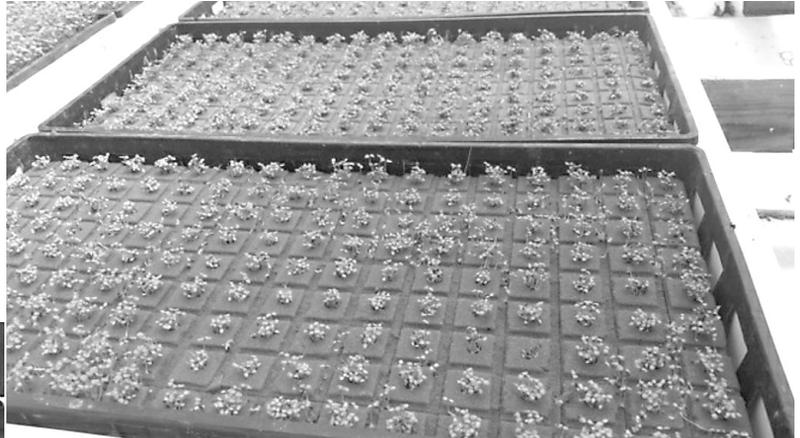
Crops including red slicing and heirloom tomatoes and cucumbers grow in Bato buckets filled with perlite. The perlite is changed annually and the buckets last about 10 years. Leachate from the buckets is routinely collected and analyzed with handheld EC (electrical conductivity) and pH meters to monitor nutrient solutions. Paul noted that pH is more critical in hydroponic systems than in soil-based systems.



Tomato growing in a Bato bucket.

A tip Paul offered for growers new to hydroponic production is to use a supplier with in-house technical advice. Once you gain experience, this technical advice may not be needed.

Transplants previously were grown in rockwool starter cubes. However, now a new formulation of Oasis Horticultubes that allows for in faster germination than previous formulations is used. The Oasis product costs about 40% less than the rockwool one.



Upland cress transplants growing in Oasis Horticultubes.

Paul stressed the importance of marketing on our tour. About 50% of his time is spent on growing crops and the other 50% on marketing them. After 2 years of research, in 2005 the operation started with 3 hydroponic greenhouses. As markets have opened the operation has expanded.

Vegetables are marketed year-round. Mock's obtained GAPs (Good Agricultural Practices) certification in 2008 and is one of only a few hydroponic operations on the east coast with this certification which opens important markets. Paul wholesales to grocery stores and food distributors in the Washington, DC and Baltimore, MD areas including to Whole Foods, Wegmans and Coastal Sunbelt Produce and to local restaurants.

Vegetables are also direct marketed through seven farmers markets including the Berkeley Springs Farmers Market, Silver Springs Farmers Market (West Virginia), Bethesda Farmers

(continued on page 19)

GENERAL

On the Road... (continued from page 18)

Market (Maryland), Bethesda Central Farmers Market (Maryland) and Leesburg Farmers Market (Virginia). One problem Paul noted about marketing through farmers markets is that weekly they are open about 4 hours of 168. Marketing at several farmers markets and through wholesale outlets greatly expands marketing opportunities. For example, about 85% of the heirloom tomatoes grown are sold at farmers markets; 15% are sold through the wholesale outlets. While about 5% of the lettuce is sold at farmers markets and 95% through the wholesale outlets. And, 100% of the ginger grown is sold through farmers markets.

We would like to thank Paul for showing us around his operation.



Lettuce packaged for sale.



Lettuce being harvested for wholesale distribution. The operation gets 97%

Dr. Sanchez and Dr. Lamont are with the Department of Plant Science at Penn State Univ. while Mr. Ford is with Penn State Extension in Blair County. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, August 15, 2014.



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VEGETABLE PRODUCTION

Verticillium Wilt Diagnosed in Multiple Crops in 2014

Beth Gugino

Environmental conditions have been more favorable for Verticillium Wilt this year and as a result of the cooler wet soils, Verticillium has been diagnosed in multiple crops.



V-shaped lesions characteristic of Verticillium Wilt on eggplant (Photo: Tom Zitter, Cornell University).

This season the soilborne fungal pathogen Verticillium has been diagnosed on a number of different crops including potato, tomato, eggplant, watermelon and muskmelon. This disease has a very wide host range that includes many vegetables and is favored by the cooler wet soil conditions. A number of these

samples have also been diagnosed with Pythium root rot and have been lacking fine feeder roots. Verticillium will infect through the roots and grow through the vascular system of the plant causing it to wilt and collapse usually during flowering or fruiting. Frequently, the wilting and V-shaped chlorotic lesions are observed on one half of the plant. When the stems are cut open vascular discoloration is often observed. Once the plant is infected there is no treatment. Management focuses on prevention through use of crop rotation and planting resistant cultivars. In seed catalogues, the letter V is often used to denote Verticillium resistance. For greenhouse and high tunnel production, grafting onto a resistant rootstock is another management option. The pathogen survives as microsclerotia in the soil so rapid decomposition of the crop residue after harvest or removal of the infected plants from the field will reduce the development of microsclerotia in the diseased tissue. Research from the lab of Dr. Krishna Subbarao from the University of California, Davis has demonstrated that incorporation of fresh broccoli and brassica residue can help reduce the populations of Verticillium microsclerotia are another potential tool for the integrated management of Verticillium wilt in diverse vegetable production systems. The microsclerotia can survive in the soil for several years.

*Dr. Gugino is with the Department of Plant Pathology and Microbiology at Penn State Univ. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, August 27, 2014.*

Bacterial Disease on Pumpkin Fruit

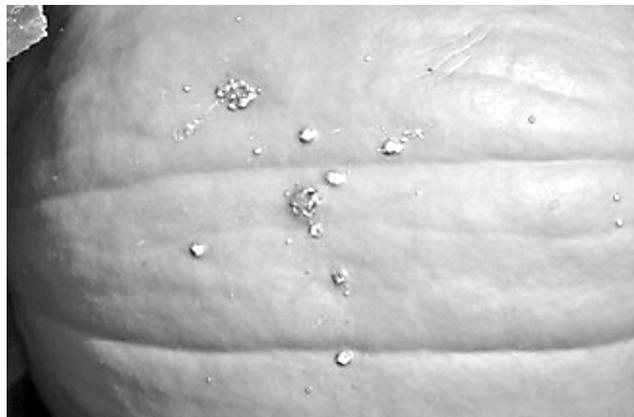
Beth Gugino

In many growing regions in Pennsylvania, cucurbits including pumpkin have been hit hard with bacterial diseases. Unfortunately, the symptoms are now being noticed on the fruit as growers begin harvesting for the fall season.

Unfortunately, 2014 is going to be remembered as a bad year for bacterial diseases in vegetable crops including pumpkin for several regions of the state. As pumpkins are being harvested for market, growers are seeing small circular whitish lesions on the fruit.

Depending on the cultivar, they can be surrounded by dark margin or sometimes a more orangish-yellow to tan margin if the cultivar has a white rind.

These could be the result of either bacterial leaf spot caused by *Xanthomonas cucurbitae* or angular leaf spot caused by *Pseudomonas syringae* pv. *lachrymans* however, the latter is more common on pumpkin. Both are foliar diseases and the fruit become infected when the bacteria are splash dispersed from the leaves onto the fruit or transferred during via passing equipment or people. The bacteria will colonize the lenticels on the fruit surface and under favorable conditions multiply and lead to the development of visible symptoms. The lesions can expand



and exudates can ooze from the lesions and dry on the outside of the fruit. Secondary organisms can also infect and lead to soft rot.

Both pathogens are thought to be seedborne but the impact on disease development is not well understood. Efforts are being made at several universities to better understand the epidemiology of these bacterial diseases and to identify a potential seed treatment protocol since cucurbit seed is too sensitive to hot-water treat. A 2-year minimum crop rotation is recommended to

allow the crop residue to thoroughly decompose. Applications of copper tank mixed with mancozeb beginning at fruit set through expansion will help reduce fruit symptoms, however thorough coverage of the leaves and fruit is necessary. Several university research trials have also demonstrated a reduction in fruit symptoms with the application of Actigard, a plant defense inducing product, in addition to copper prior to disease onset.

*Dr. Gugino is with the Department of Plant Pathology and Microbiology at Penn State Univ. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, September 10, 2014.*

Northern Corn Leaf Blight is Appearing in Late Season Planted Sweet Corn

Beth Gugino

In Pennsylvania, Northern Corn Leaf Blight (NCLB) is favored by cooler temperatures and longer dew periods therefore, this disease is more problematic in later season sweet corn plantings.

Symptoms of NCLB on a susceptible (left) and resistant (right) sweet corn hybrids (omafra.gov.on.ca).



Northern corn leaf blight is a disease caused by the fungal pathogen *Exserohilum turcicum*. The foliar lesions first develop on the lower leaves and are initially small, elliptical and gray-green in color. As the disease progresses the lesions will expand to 1 to 6 inches long, become tan in color and are not restricted by the leaf veins. Eventually, the lesions will coalesce and cover the entire leaf. Under humid conditions, the lesions will produce dark gray spores on the lower leaf surface giving them a dusty appearance. In Pennsylvania, conditions are more favorable for disease later in the season as the temperatures start to drop and dew periods lengthen thus NCLB tends to be more problematic in later sweet corn plantings.

Symptoms are usually first observed on the lower leaves and the spread up the plant. The greatest losses from NCLB occur when severe necrosis develops on the upper 2/3 of crop canopy by silking. The reduction in photosynthesis due to the necrosis results in reduced ear fill and when symptoms develop on the husks they appear older and are less marketable.

Cucurbit Downy Mildew Update for Pennsylvania

Beth Gugino

To date, downy mildew has only been confirmed on cucumber in Pennsylvania. Since downy mildew does not affect the fruit, as fruit reaches maturity, the management of this disease can become less a priority.

Despite the numerous earlier outbreaks of downy mildew on multiple hosts in adjacent states to the south and west, downy mildew has only been confirmed on cucumber in Centre, Lancaster, York, and most recently in Washington Co. Current weather patterns the past few days have been most favorable for disease development and spread in the lower southern tier part of the state in Chester, Lancaster, York, Adams and Franklin Counties and the rest of the mid-Atlantic region.



Since downy mildew does not directly affect the fruit, as we get closer to harvest and the fruit are fully mature, managing the disease becomes less important. It is primarily a concern earlier in the season because it reduces the photosynthetic capacity of the plant which leads to lower fruit quality and an inability of the plant to ripen the fruit. Defoliation can lead to sunscald if the fruit have not fully matured.

If you suspect downy mildew on your farm to let me know either by email atbkugino@psu.edu or by phone at 814-865-7328 or contact your local Penn State Cooperative Extension

Office. For the latest information on outbreaks and to receive email or text alerts please visit the Cucurbit Downy Mildew Forecasting website (<http://cdm.ipmpipe.org/index.php>). Updates will also be made to the 1-800-PENN-IPM hotline weekly or more frequently if needed to provide growers with information that can be used to help make timely management decisions.

Host resistance can still be an effective tool for managing NCLB especially for later sweet corn plantings. There are different types of resistance genes that have been introduced into sweet corn hybrids through traditional breeding (not GMOs). These various resistance genes will limit lesion size, lesion number and the amount of sporulation within each lesion. The crop should be scouted regularly, focusing on the lower leaves where symptoms develop first. Protectant fungicides like chlorothalonil can be applied when there are reports of NCLB in the area but symptoms have not been observed in the field. Good coverage is critical. NCLB specific fungicides include those in FRAC group 11 (strobilurins; e.g. Quadris and Headline) and FRAC group 3 (triazoles; e.g. Tilt). There are also a number of products that contain both FRAC groups (11 + 3; e.g. Quilt and Stratego). Rotate between these FRAC codes and tank mix with a broadspectrum protectant for resistance management when symptoms are first observed in the field will help manage NCLB. PHIs vary between the products so read the labels carefully when the crop is near harvest. Also depending on the label, NCLB might be referred to as Helminthosporium leaf blight which is collectively refers to both Northern corn leaf blight and Southern corn leaf blight.

*Dr. Gugino is with the Department of Plant Pathology and Microbiology at Penn State Univ. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, September 10, 2014.*

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VEGETABLE PRODUCTION

Late Blight Melt Down

Beth Gugino

Although there are areas across the state where late blight hasn't been observed, it continues to spread within commercial fields and home gardens in 19 counties where it has been confirmed.

To-date, late blight has been confirmed in 18 counties in Pennsylvania including Cambria, Lancaster, Chester, Clinton, Lackawanna, Berks, Centre, Northumberland, Columbia, Snyder, Perry, Blair, Bedford, Montour, Lehigh, Lycoming, Indiana, and Schuylkill and is suspected in Franklin as well.

As expected, the cool wet weather last week was very favorable for the spread of late blight and it has moved from commercial fields into many home gardens. Home gardeners are being advised to harvest asymptomatic fruit and ripen them off the vine and remove and dispose of infected plants to reduce further spread of the disease. Growers who have been able to maintain a regular spray program that includes recommended late blight specific fungicides (in spite of the weather) have been able to keep it managed. The recommended organic products work best when applied regularly with good coverage before symptoms are observed and before disease pressure is too high. Roguing and continued use of copper will help reduce the spread of secondary inoculum and help to protect new growth. Results from my product efficacy trials this year will be



summarized and made available at the end of the season.

With much of the focus on late blight, don't forget about early blight or Septoria leaf spot which are also showing up with the heavy dews and significant rainfalls. Early blight is characterized by small brown to black lesions that are surrounded by a yellow halo and typically found initially on the older leaves. As the disease progresses, the larger lesions will develop a concentric ring pattern. Within those lesions, spores are produced

and frequently splash dispersed within the plant canopy and to adjacent plants. Septoria lesions are smaller and usually have a tan center and dark margin. Both of these diseases can also defoliate the plants from the bottom up. The fungicides used to manage these diseases are different from those for late blight. However, the tank mixed protectant fungicides including copper, chlorothalonil and mancozeb will provide some protection. See the [2014 Commercial Vegetable Production Recommendations](#) for a list of recommended products and visit USAblight.org to the latest list of confirmed reports.

*Dr. Gugino is with the Department of Plant Pathology and Microbiology at Penn State Univ. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, August 27, 2014.*

Ethnic Crops Presentation Videos Available

Dr. James Simon's presentation titled "Ethnic Crops: Production and Nutritional Considerations" at the recent Ethnic Greens and Herbs Workshop is now available for viewing on YouTube. His hour-long presentation has been divided into 13 video segments that can be watched all together or separately, based on viewer preference. Each video contains a description so users can easily find information relevant to them.

In Video 5 (<http://bit.ly/1BW7hUo>), Dr. Simon presents data on amaranth. On a recent trip to Zambia, Dr. Simon recounts the great popularity of amaranth. It is not considered a famine crop; sub-Saharan Africans grow it or harvest it from the wild, and they enjoy it.

There are three different types of amaranth: green leaf, purple leaf, and tri-color. Each color is preferred by different groups of consumers. For example, in some areas, the purple type is believed to be poisonous. In America, the purple type is seen as being rich in anthocyanins. It is imperative to market the different colors appropriately to the beliefs of the targeted consumers.

In the amaranth field trials conducted in New Jersey, Florida, and Massachusetts, the study began with 58 accessions. These 58 were screened for viability and then reduced to 16 lines. Lines were removed due to premature flowering, poor grow back, and poor form/habit. The top three performers showed excellent grow back vigor, very good insect resistance, and had a very favorable appearance to many African cultures.

In Video 6 (<http://bit.ly/1IsL3EK>), data from the production trials of Malabar spinach is discussed. The production team found

that it was very popular. When it was brought to stores, customers really wanted to buy it. There were some downsides to this crop though. To reach high yields, the spinach must be trellised. Unfortunately, trellising is a significant investment in both time and money, so growing this crop may not be feasible. Another issue with growing Malabar spinach is that it needs to be harvested frequently.

This is another significant cost that may make this crop unprofitable. It is important to weigh the demand with the time and monetary investments in deciding if this is a crop you want to pursue.

*The Ethnic Greens and Herbs Workshop project is being funded by a USDA National Institute of Food and Agriculture, Specialty Crop Research Initiative grant, Project Award Number: SCRI 2009-51181-06035. The goal of the Specialty Crop Research Initiative is to solve critical specialty crop agriculture issues and address priorities through multifunctional research and Extension. For more information about the program, visit <http://www.csrees.usda.gov>. From the **Ethnic Greens and Herbs Workshop Newsletter 19**, Penn State University.*

Using Copper Fungicides

S.B. Scheufele, K. Campbell-Nelson and R. Hazzard

Copper products play an important role in disease management in both conventional and organic systems. They are one of the most effective controls for bacterial diseases. In organic production, copper products are the main protectant fungicide used in the control of oomycete diseases such as late blight and downy mildews. As more copper products become available, it is helpful to understand the differences and benefits of various active ingredients and formulations. Solubility, phytotoxicity, human health risks, impact on soil ecology, labeled crops and diseases, and efficacy are important considerations in using particular copper products.

How Copper Works

When copper (Cu) is mixed with water, copper ions (Cu²⁺) are released into solution. Modern copper products typically use insoluble or “fixed” forms of copper, creating a suspension of copper molecules in the spray solution. These undissolved copper particles persist on plant surfaces after the spray dries and copper ions are released from these deposits each time the plant surface becomes wet. The gradual release of copper ions from the copper deposits provides residual protection against plant pathogens present on the leaf surface. Copper ions kill pathogens primarily by destroying cell membranes and proteins and by disrupting protein synthesis. Since the mode of action of copper targets such fundamental components of living tissues, it affects a wide range of plant pathogens including bacteria, fungi, and oomycetes, but can also damage plant cells and be toxic to humans and other non-target organisms. Achieving the best control without injuring plant foliage and fruit depends on the concentration and rate of release of copper ions on the leaf surface, which is determined largely by the solubility of the copper formulation.

Solubility

Less soluble (fixed) formulations release copper ions more slowly. This slow-release lowers the risk of phytotoxicity and provides longer residual activity. The following are low-solubility active ingredients: copper oxide (e.g., Nordox), copper hydroxide (e.g., Kocide, Champ), copper oxychloride (e.g., COCS and BadgeX2), and copper octanoate (copper ions linked to fatty acids to form a soap, e.g., TennCop, Cueva). More soluble formulations act rapidly but have higher risk of phytotoxicity and shorter residual activity. Basic copper sulfate and copper sulfate pentahydrate are highly soluble.

Metallic Copper Equivalent

Product labels list percent active ingredient (eg., 23.8% copper oxychloride or 98% basic copper sulfate), but this doesn't tell you the actual metallic copper by weight, as the formulation also impacts the total copper present. Look for the “metallic copper equivalent” listed below the active ingredients on the label to determine the amount of actual copper by weight. A product with 40% metallic copper has 0.4 lb metallic copper per lb of product. The range in MCE among products is vast, ranging from under 1.8% to over 50% copper by weight. It is important to consider the MCE because the effectiveness of a copper spray is highly correlated to the amount of copper applied.

Effects of pH, Spray Additives, and Weather

- Under acidic conditions, copper solubility and the potential for phytotoxicity increases. Spray solutions should be kept above pH 6-7, depending on the formulation, to prevent excessive amounts of copper ions from being released and possibly damaging fruit and foliage. Lime can be added to spray water to raise the pH.

- Adding maneb or mancozeb to copper products as a tank mix increases the release of copper ions in solution. There are pre-mixed products (eg., ManKocide) available or growers can make their own mixture. This may be especially helpful for controlling bacterial diseases such as bacterial speck, spot and canker of tomato.

- Using an approved adjuvant or ‘sticker’ may help the product to be more rainfast, but when used with the highly soluble copper sulfate formulations, can cause phytotoxicity.

- Finely ground compounds will be more active than coarser ground materials because the smaller particles result in better coverage of the leaf and are less likely to be removed from the leaf by wind and rain.

- Copper can accumulate to high levels on plant tissue when sprayed repeatedly to cover new growth and when there is no rain. In this situation, after a rain event, a large amount of copper ions may be released leading to phytotoxicity.

- The risk of plant injury increases when drying conditions are slowed due to cool wet weather, as the duration of active release of copper ions on the leaf tissue is increased.

- For each product, application rates vary with crop and disease. The recommended rate for a given crop may have a 2-fold difference between the high and low rate. Higher rates are recommended when disease pressure is high or conditions are especially favorable. Most products are labeled for a wide range of vegetables, including brassicas, cucurbits, and solanaceous crops.

- Always read the label instructions. When mixing, follow the tank mix partner instructions.

Safety

Human Health Hazards. Eye exposure is the most serious risk associated with using copper hydroxide. Eye damage can be irreversible. There is moderate risk from skin contact, ingestion and inhalation. Products vary in EPA hazard rating, most

(continued on page 24)

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VEGETABLE PRODUCTION

Using Copper... (continued from page 23)

are "Warning" or "Danger" but Badge SC has a lower risk "Caution" label. The greatest health risk is to the person who mixes and sprays the material. Proper protective equipment should be worn when handling or applying copper products as with any pesticide or fertilizer. The required protective equipment is specified on the label and usually includes: long-sleeved shirt and long pants, chemical resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride, shoes plus socks, and protective eyewear. Though not usually required, you may also want to consider wearing a respirator or dust mask, especially for mixing. Dry product sometimes comes in a paper bag that has a tendency to leak out of the seams and needs additional containment such as a plastic bin. Always label secondary containers. Restricted Entry Interval (REI). Most copper products have an REI ranging from 24-48 hours, which means that workers are not allowed to go into treated fields to pick fruit or do any other field work for that duration of time. Plan your spray and harvest schedule to accommodate your marketing needs as well as the REI. Fruit may need to be polished before marketing, to remove the blue residue left on fruit.

Environmental Hazards

Some farmers have expressed concern about copper toxicity in the soil or with respect to soil microbes and earthworms. In addition, copper is very toxic to fish and aquatic organisms, if drift and runoff occur. In New England, this should be a concern in sandy, acidic soils near surface water. Copper usually accumulates on the soil surface (top 3 cm) where it becomes chemically bound to organic matter and clay minerals. In acidic soils, the solubility of copper increases and toxicity or runoff may occur. Copper is actually an essential plant micronutrient and, in New England, it is more often deficient than excessive in soils. The amount found naturally in soils in MA ranges from 0.1 to 8 ppm while nationally soils range up to 200ppm Cu. Crops remove less than 0.1 lb/A copper per year. An application of 1 lb of active ingredient per acre is estimated to raise the copper levels about 0.5 ppm. A single application of Nu Cop at 2 lb per acre with 77% active ingredient adds about 1.5 lb copper per acre to the soil, or could raise the concentration in the soil by 0.5 to 0.75 ppm. Therefore, the level of copper in soil would increase slowly over time, except in perennial planting systems such as apple orchards. In annual rotational systems, where copper applications might only be made in the same location every few years, copper accumulation is less of a concern. Nonetheless, copper use is regulated and certified organic farmers in the US are required to restrict their use of copper products. Regular soil tests should be taken and copper levels in the soil should be monitored.

Managing Blights in Organic Tomatoes and Potatoes Using Copper

Copper-based fungicides are labeled for use in organic systems which have demonstrated effectiveness in preventing late blight. Copper fungicides do not kill infections that are already present, they must be used preventatively in order to effectively protect plants from initial infections. Most pathogens have latent periods, when the plant is infected but does not show any symptoms. Thus, when symptoms appear, it is too late to protect the crop effectively – especially with late blight. Some strains of late blight are more aggressive than others and

this will also influence the efficacy of copper spray programs. Regular applications of copper will also help protect tomatoes from early blight and Septoria leaf spot, which can progress rapidly and cause plantings to produce far less than their full yield potential.

Several copper products are OMRI-listed for use in certified organic production and are registered for use in Massachusetts including: NuCop 50DF, Badge X2, Basic Copper 53, and Cueva. Check the OMRI website for updates or consult your certifier. As with insecticides, dry formulations are more commonly approved for use in organic systems. Note that OMRI approval is for specific formulations, and there are often multiple formulations with the same trade name (eg. Badge X2 and Badge SC, of which only Badge X2 is OMRI approved).

High Tunnel and Greenhouse Considerations

- Read the label to be sure that a product is labeled for greenhouse use. Many copper products are.
 - The same protective gear and restricted entry interval would apply.
 - Apply with sides open for ventilation.
 - Most labels require that in addition to the standard REI, an eyewash station and notice of eye risk should be available for 7 days after application.
 - If you suspect late blight, have the disease identified. Gray mold (*Fulvia*) and botrytis are common diseases in high tunnel tomatoes that look very much like late blight.
 - If tomatoes are grown in the same area year after year, and copper is used, build-up in the soil is more likely. Include copper levels in your annual soil testing. Rotate to other crops!
- The authors are with the University of Massachusetts Extension. Adapted from T. Zitter & D. Rosenberg, Cornell Plant Pathology, in the NY Commercial Horticulture Weekly Vegetable Update. June 26, 2013 From the Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Massachusetts, Vol. 26, No. 14, July 17, 2014.*



Take Steps to Avoid Herbicide Injury in Vegetables

Lee Stivers

During a recent conference call of Penn State Extension educators, specialists and faculty working with vegetable production, the topic of herbicide injury to crops was brought up repeatedly.



Herbicide carryover symptoms on bean seedlings.

Herbicide injury to vegetable crops is not uncommon in Pennsylvania, and we have certainly seen our share of crop injury out in the field across the state this spring. Herbicide injury symptoms can vary, but with a little detective work, we can usually determine the likely culprit. Herbicide injury in vegetable and small fruit crops may be the result of herbicide carryover from previous crops, drift from nearby applications, or improper applications. If injury is mild, and plants are actively growing, they can often grow out of the damage and still make a crop. However, weather conditions such as the rain and cool temperatures we experienced this spring can increase the severity of herbicide injury by slowing early crop growth and plant metabolism of the herbicide.

Common symptoms of herbicide injury.

Herbicide injury symptoms in vegetables and small fruit can vary widely, but the most common include stunting, yellowing of foliage, whitening or bleaching of foliage, malformed roots, leaf



Injury from herbicide carryover.

puckering, distorted growth, leaf speckling, and of course, plant death.

Herbicides applied to a previous crop may persist in the soil and be taken up by growing seedlings. For example, in the picture above, bean seedlings planted into a field where a mesotrione herbicide (e.g. Lumax or Callisto; 18 month plant-back restriction) was applied to corn the previous year showed stunting and bleaching symptoms. Mesotrione carryover can result in injury to other crops as well, such as strawberry, shown in the photo to the right.

Injury from drift.

An herbicide applied to a crop nearby—even on the next hillside over!—can damage a vegetable crop if there is drift from one field to another.

Drift can be a direct result of the spray application itself, or the herbicide can volatilize after the application and move through air currents over to the non-target crop hours after



Drift herbicide damage on tomato

(continued on page 26)

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Take Steps to Avoid... (continued from page 25)

the sprayer has left the field. The photo above shows damage to tomato, probably from an herbicide application in a nearby soybean field. It is likely that the herbicide volatilized in the heat, and then drifted onto the tomato plants, causing bleaching and stunting of the new growth.

Injury from improper application.

The third type of herbicide injury that we see in vegetables is caused by herbicides that are improperly applied. A classic example is when Dual is applied to peppers over plastic mulch. Rainfall then washes the herbicide off the surface of the plastic and into the planting holes, concentrating it around the roots of the transplant, and causing injury.

Herbicides may be over-applied as well, either through improper mixing and calibration, or overlapping passes with a sprayer. For example, the pumpkin plant in the photo above shows severe growth distortion after it received a double rate of Sandea herbicide.

Steps to avoiding herbicide injury.

Pay attention to plant back restrictions on herbicide labels. Plant back restrictions for common corn and soybean herbicides can be found in this chart at <http://http/extension.psu.edu/plants/crops/soil-management/cover-crops/herbicide-persistence/herbicide-carryover-table>. Plant back restrictions are more than friendly recommendations for you to consider; as part of the herbicide label, they are the law!

Manage herbicide applications to minimize persistence in subsequent crops. Herbicide carryover can be minimized by taking into account factors such as product selection, application rate, application timing, soil texture, and tillage in the crop preceding the vegetable crop. Penn State Agronomy Facts 36 (available at <http://http/extension.psu.edu/pests/weeds/control/persistence-of-herbicides-in-soil>) provides more details on persistence of herbicides in soils.

Avoid off-site movement of herbicides due to spray drift and vapor drift. Best practices for minimizing drift include spraying



Pumpkin showing growth distortion from double rate of Sandea

when wind speed are lowest; reducing operating pressure; use of drift reduction nozzles; lowering boom heights; and spraying at slower ground speeds. Choose herbicides with low volatility when possible, and avoid applying higher volatility materials during hot weather.

Always follow the label when it comes to application rates and types of allowable applications, particularly when working with plastic mulches, row covers and tunnels.

*Ms. Stivers is with Penn State Extension in Washington County. From the **Vegetable, Small Fruit and Mushroom Production News**, Penn State Extension, <http://extension.psu.edu/plants/vegetable-fruit/news/2014>, June 23, 2014.*


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Blueberries – Popular, but Vexing!

Kathleen Demchak

This year in particular has been a tough year for blueberries. We've had some winter injury issues, but in addition to those, we are seeing nutritional problems that tend to recur on different farms in various years.

Blueberries are a completely different plant type from the rest of the food crops that we grow, and are more similar in their needs to azaleas and rhododendrons than other food crops, except for cranberries. In fact, if you have a soil with a high CEC that is great for growing tomatoes or other "heavy feeders", you probably don't have a soil that is very good for blueberries. This means that you will need to take time to modify your soil before planting to give the plants a chance at growing well. Some of the deficiencies we are seeing commonly this year (and in many others) are described below.

Plants are deficient in magnesium. The cause is usually that the soils the blueberries are being grown in are high in calcium. Calcium, magnesium, and potassium compete for the same sites on soil particles and roots, so too much of one can cause a deficiency of one or both of the others. Blueberries really don't like calcium, and belong to a group of plants called "calcifuges", which basically means "calcium-fleeing". High calcium levels may occur because the soil was limed in the past, or because the soil is derived from parent material that is high in calcium, as is often the case with many of our fertile valley soils. In addition to this, some soils are also low in magnesium.

What can you do about this problem? Be sure the soil pH had been adjusted to the correct range for blueberries (4.5 to 5.0) before you plant. In the process of dropping the soil pH, some of the calcium is "floated off" of the soil particles, and is eventually leached out (though some magnesium will be also). However, this may take quite some time (2 to 3 years), so if you wait to drop the pH until after the plants are planted, they will not thrive. You also run the risk of burning the blueberry roots (and anything else that happens to be in the soil) if you add too much sulfur after planting. Sulfur prills, even moreso than the powdered form of sulfur, take a long time to react, and it is best if the soil is worked periodically after their application to help break them down. Of course, you can only do this if the plants aren't already planted. Then re-test to see if you need to add additional magnesium before you plant. Magnesium (and calcium) move through the soil profile very slowly, so it is much better to incorporate magnesium before planting rather than to top-dress it later and expect it to percolate through.

Also, when plants are being planted, at least half of the soil volume placed back into the planting hole should be organic matter, preferably peat moss, because it is acidic already, and basically replaces half of a less-than-desirable soil (from the blueberry plant's perspective) with a great medium. Keep the plantings mulched, preferably with a rotted sawdust, possibly mixed half with bark mulch. Though we've found hardwood sawdust to work fine if we keep track of the pH, the pH of mulch derived from conifers (pine for example) is lower, and the pH of sawdust of certain hardwoods, beech and maple in particular, can be very high (greater than 8.0). Using ammonium sulfate as the nitrogen source helps keep the soil pH low even if a hardwood sawdust is used. Just be sure that the sawdust is decomposed when you apply it, or it may tie up nitrogen as it decomposes, which brings us to our second nutritional issue.

Plants are deficient in nitrogen. This could be from the application of fresh sawdust in many cases. However, in this

year in particular, much of the nitrogen from spring applications may have been leached out by heavy rains. At this point, it's too late to apply additional nitrogen because you could push growth that could be winter-injured. However, when you make your usual spring nitrogen applications, apply half when the plants begin to grow, and the other half four to six weeks later. This makes the best use of the nitrogen because the plants will be able to take it up, rather than it being leached away with spring rains before they have a chance to use it.

Finally, our third issue that we are seeing:

Plants are deficient in iron or zinc. Iron and zinc become much more available when the soil pH is low. In some cases, though, the pH is in the correct range, but the plants are deficient anyway. In most of these cases, soil tests show extremely high phosphorus levels, and it's likely that the excess phosphorus is interacting with the micronutrients to decrease their availability.

The solution to this problem, at the risk of sounding repetitive, is to first be sure the soil pH is in the correct range before planting. If the soil pH is in the correct range, foliar applications of the micronutrients can be helpful, especially if soil phosphorus is high, and a soil application of the micronutrients may also be needed. If the soil pH is not the correct range, a soil application of micronutrients is nearly pointless as the micronutrients will become tied up.

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



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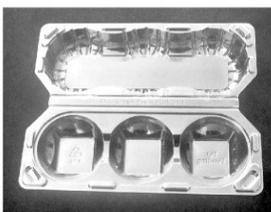
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