PENNSYLVANIA
VEGETABLE GROWERS

NEWS

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for the commercial vegetable, potato and berry grower

PDA Plans FSMA Produce Safety Rule Town Hall Meetings

The Food and Drug Administration (FDA) Food Safety Modernization Act (FSMA) Produce Safety rule is now final, and the earliest compliance dates for some farms begin one year after the effective date of the final rule. The rule establishes science-based minimum standards for the safe growing, harvesting, packing and holding of fruits and vegetables grown for human consumption. The new standards include requirements for agricultural water quality, employee health and hygiene, animals, biological soil amendments of animal origin (such as compost and manure), and equipment, tools, and buildings. The rule also includes a number of key definitions, exemptions, and variances.

Implementation of the Produce Safety rule is dependent on partnerships between FDA, states, and farmers, both to deliver education and technical assistance and to provide on-going inspection, compliance and oversight. The Pennsylvania Department of Agriculture recently applied for funding through FDA to implement the Produce Safety rule. The funding can be utilized for planning, infrastructure building, training and education, and other related activities.

State-level implementation of the Produce Safety rule will require the help of organizations such as the Pennsylvania Vegetable Growers Association, and produce growers like you. We are seeking your partnership to provide feedback and input on how the department can most effectively deliver education and technical assistance, and to provide on-going inspection and compliance. We value your feedback, and also want to make ourselves available to answer your questions.

To kick-off this process, Secretary Redding will host two FSMA Produce Safety Rule Town Hall meetings in June. Please join us on Thursday, June 23 from 8 – 10 a.m. or on Monday, June 27 from 10 a.m. – 12 p.m. in room 309 at the Department of Agriculture, located at 2301 N. Cameron St., Harrisburg, PA 17110. RSVP to Erin Smith, Policy Director, at 717-772-4365 or erins@pa.gov.

Late Blight Confirmed in a Western Maryland Greenhouse

On May 17, 2016, late blight was confirmed on tomato transplants in a greenhouse in western Maryland.

Tomato transplant samples were sent to Cornell for genotyping and determined to be US23. The past several years, US23 has been the predominant genotype along the east coast. The grower has destroyed the symptomatic plants and is now applying fungicides. The original source has not yet been determined but these plants were grown from seed and destined for the home garden market.

Characteristic symptoms of late blight on the upper surface of a tomato leaf.

This is a good time to remind everyone that tomato and potato plants are susceptible to late blight, caused by the pathogen *Phytophthora infestans,* at any growth stage from a seedling to a mature plant. If observed in a greenhouse roguing out not only the symptomatic plants and flats but also roguing out all the surrounding non-symptomatic flats is important. Many of these plants are also likely infected but have not developed symptoms yet and may not for several days or weeks depending on the environmental conditions.

To identify late blight, look for lesions that are irregular in shape and initially water-soaked and pale-green before turning more gray-brown in color. Under humid conditions, the lesions on the underside of the leaves will sporulate giving them a white fuzzy appearance.

Although late blight did not run rampant across Pennsylvania last year, the relatively mild winter and current cool and wet conditions are favorable for late blight infected potato volunteers to be a potential source of the pathogen. This is the first report of late blight north of South Carolina this season. For more information on late blight disease outbreaks and management recommendations throughout the season check back to our website as well as the USAblight.org website.

*From the **Vegetable, Small Fruit and Mushroom Production News,** Penn State Extension, extension.psu.edu/vegetable-fruit/news, May 18, 2016.*

NEWS

On the Road to Yarnick's Farm

Elsa Sanchez, William Lamont and Robert Pollock

It's March and we're on the road to visit Yarnick's Farm in Indiana, PA. The farm includes 250 acres of outdoor production and 20 greenhouses of varying sizes and shapes.

About 70% of produce is wholesaled locally to restaurants and grocery stores with 30% going to two Yarnick's Markets and farmers markets. Customers are able to keep up with farm activities through the farm website at http://yarnicksfarm.com/, Facebook page (Yarnicks Farm and Greenhouses) and biweekly e-newsletter. Three food and music festivals are also held at the farm annually.

One of several greenhouses filled with transplants.

Danny Yarnick gave us a tour of his extensive greenhouse production.

Several houses were devoted to growing transplants for use on the farm as well as for sale at their farm markets and to other farmers. Many cultivars of cabbage, broccoli, beets, onions, spinach, various types of lettuce, kale and kohlrabi were grown in 120-cell flats and 6-packs. Tomatoes and peppers were in 4-inch pots. We were impressed with the uniformity of the transplants. In the seeding house pallets of plastic flats filled with Pro Mix germination medium were waiting to be seeded with a vacuum seeder. A large volume of seed were organized by type in plastic storage containers.

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*The **Pennsylvania Vegetable Growers News** is the official monthly publication of the Pennsylvania Vegetable Growers Association, Inc., 815 Middle Road, Richfield, PA 17086-9205*
phone and fax - 717-694-3596, email - pvga@pvga.org 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 furture viability of the commercial vegetable, potato and berry industries in Pennsylvania.

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

National News Briefs

Farmers Across the Country Facing Labor Issues

The Dambach family was expecting workers on March 1. Instead, the Dambachs were left scrambling for workers at Lake Forest Gardens—a wholesale and retail nursery- thanks to paperwork and other delays at the federal level. Like many in agriculture, the Dambachs uses the H-2A system to find foreign workers for their farm. And like many across the country, a series of delays with processing paperwork left farmers scrambling to find workers or leave crucial spring work undone.

Alan Dambach, whose father started the family business and now whose son is in charge, was able to find some local labor at his Beaver Country nursery—but those were employees who help on the farm during the winter season. Repeated attempts to work with local labor companies yielded no workers—even at $12 an hour.

"It's not like they are digging holes, it's mulching and loading trucks," Dambach said. "It's not a big physical deal. But we got zero workers."

Dambach's crew of eight migrant workers showed up on April 1—a month late due to paperwork delays. They are now scrambling to make up on missed farm work. The American Farm Bureau Federation has heard from farmers in at least 20 states who are facing labor shortages due to paperwork delays.

"Many farmer members have called us, and state Farm Bureaus, asking for help," said AFBF President Zippy Duvall. "They face serious hurdles in getting visas for workers in time to tend and harvest this year's crops. Paperwork delays have created a backlog of 30 days or more in processing H-2A applications at both the Department of Labor and United States Citizenship and Immigration Services."

The Department of Labor is failing to comply with rules that require it to respond to applications 30 days prior to the day farmers need workers, Duvall said. That is also coupled with problems at the United States Citizenship and Immigration Services.

Farm Bureau is calling on Congress to pass immigration reform that gives farmers access to a legal and stable workforce. Duvall also said there is a need to modernize the H-2A system, including the need to accept electronic documentation, instead of sending out documents by regular mail.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Federal Government Moves to Modernize H-2A System

The federal government is working on an electronic system for approving temporary farm workers under the H-2A system. Federal agencies had previously only accepted certain paperwork by mail. The United States Citizenship and Immigration Services and the State Department are launching an online approval platform, aimed at expediting H-2A processing. "These visa approval delays have gone on far too long and cost farmers across the country hundreds of thousands of dollars in lost business," Farm Bureau said in a statement. Farmers, including some in Pennsylvania, have reported delays in paperwork processing, which has prevented them from securing workers in time to perform crucial farm tasks. While Farm Bureau is pleased that federal agencies are taking steps to address the issue, there is a need for an overall change to the nation's immigration system so that farmers can find a predictable source of labor.

*From the **Farm Bureau Express,** Penna. Farm Bureau, May 20, 2016.*

Monarch Conservation Focused on Milkweed

The monarch butterfly is unique in the insect world. The iconic butterfly—with its distinct orange and black colors—migrates across North America. They spend their winter months in Mexico, and fly over the United States on their way to Canada. Come fall, they do the trip in reverse. And on their way, the monarch uses milkweed for laying eggs, and for the caterpillars to feast on. However, with petitions underway to place the monarch butterfly on the federal Endangered Species Act, a coalition is urging farmers to take some easy conservation measures to protect monarch populations.

"If it were listed under the Endangered Species Act, it could pose some significant challenges for the corn and soybean belt," said Ryan Yates director of Congressional relations for the American Farm Bureau Federation.

Farm Bureau is among several agriculture organizations and businesses that are part of a coalition aimed at improving monarch populations. Because milkweed is an essential plant for monarch health, farmers are encouraged to keep plants found in fence rows, ditches or on non-production areas on their farms, Yates said. Farmers should still treat milkweed that is interfering with row crop production as part of their normal crop treatment plan, Yates said. But farmers should consider keeping milkweed in place in areas that do not harm crop production, he said.

Farm Bureau and other partners are conducting an educational outreach plan to agriculture on the importance of monarch conservation. The hope is that voluntary landowner practices can help monarch populations rebound and prevent the species from being listed on the Endangered Species Act. Listing the monarch butterfly through the Endangered Species Act could cause difficulties for farmers, Yates said. Farmers could see restrictions placed on herbicide and pesticide applications, he said.

"I can't draw what the scenario would look like, but would it have an effect on agriculture? Absolutely," he said. It's not just agriculture that can play a role in protecting monarch habitats. The coalition is also working with local governments to encourage preservation of milkweed species, Yates said.

There are efforts that everyone can take to improve monarch habitat, but Farm Bureau wants to make sure farmers are educated about some simple steps they can take, Yates said.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Farm Bureau Warns of EPA Overreach

Farm Bureau is asking Congress to hold the Environmental Protection Agency accountable for repeatedly violating open government laws in its "waters of the United States" campaign. Oklahoma Farm Bureau President Tom Buchanan testified before the Senate Subcommittee on Superfund, Waste Management and Regulatory on the flawed rulemaking process followed by the EPA. Farm Bureau is troubled by a ruling from

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the Government Accountability Office that found the EPA used covert propaganda to promote WOTUS.

"From the day it first issued the proposed rule, EPA behaved like an advocate for a decision that was already made—willing to say most anything to get to the desired result," said Buchanan, who testified on behalf of Farm Bureau. "It waged a public relations campaign aimed directly at farmers and ranchers."

Farmers across the country are concerned at the methods the EPA used to promote the WOTUS rule, including social media campaigns, Buchanan said.

"The EPA did use covert propaganda to mislead the public and violate the anti-lobbying act and was more focused on promoting a flawed WOTUS rule than keeping an open mind, or hearing good faith concerns with their proposal," he said. "Farmers and ranchers deserve better when important matters of public policy are discussed and are at stake."

Despite public comments to the contrary, a careful reading of the WOTUS rule by Farm Bureau has found dry land features will fit the definition of "waters of the U.S." making it illegal to farm or do any land changes without first seeking federal approval. Equally troubling is the way the EPA conducted the rulemaking process, Buchanan said. While the EPA claimed it had public support for the rule, the agency ignored concerns from state and local governments, businesses and organizations that represent nearly every segment of the U.S. economy, Buchanan said. The agency also ignored regulatory safeguards for small businesses—through the Regulatory Flexibility Act—which requires federal agencies to review regulations for their impact on small businesses.

Farm Bureau hopes Congress will take a close look at the actions of the EPA throughout the whole rulemaking process.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Adoption of Cover Crops Varies in the U.S.

Cover crops are grown to provide cover on the soil which benefits soil health, reduces soil erosion and retains nutrients. However, only about 4 percent of agricultural producers in the U.S. plant cover crops on their operations as reported by the USDA in 2010-2011. Agricultural producers operating in the Chesapeake Bay Watershed have increased annual plantings of cover crops from 5 percent in 2006 to 18 percent in 2011. Managing cover crops is considered a best management practice and, to a large extent, is recognized by the Chesapeake Bay Model if government cost-share and technical assistance were involved.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Delaying Vegetable Harvest After a Rain May Improve Food Safety

Delaying the harvest of vegetable crops for 24 hours after a rain or irrigation application has been proven to reduce pathogens such as Listeria and E. coli on the crop. Moisture creates conditions that favor pathogen development in the soil which could be transferred to the vegetable crop. Cornell University discovered after a rain or irrigation, the presence of the Listeria pathogen was 25 times greater but a delay of 24 hours provides time to dry the soil surface and greatly reduces the presence of the pathogen.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Farm Bureau Offers Challenge to Rural Entrepreneurs

The American Farm Bureau Federation is holding its third annual Rural Entrepreneurship Challenge, with contestants competing for $145,000 to fund their projects. The challenge is a competition for business owners and entrepreneurs with agriculture and food business ideas that have a positive impact on rural communities throughout the country. A total of $145,000 in startup funds will be distributed to 10 agriculture or food businesses. Applicants have until June 30 to apply.

The top 10 teams will be announced in October. Six semi-finalists teams will each receive $10,000 and four teams will advance and compete for $85,000. Those final four teams will compete at an event during AFBF's 98th Annual Convention and IDEAg Trade Show in Phoenix, Arizona, January 7-9, 2017.

Those final four teams will be competing for the title of Farm Bureau Entrepreneur of the Year and $30,000. Finalists can also win the People's Choice Award at $25,000. The runner up teams will receive $15,000.

Applicants need to be current Farm Bureau members and have a business related to agriculture or food. Eligible types of businesses include agricultural technology, value added process, farm-to-table restaurants and farm markets. Businesses do not need to be located in a rural area but it must have a direct impact on rural residents.

To submit your application, or for more information, visit: www.strongruralamerica.com/challenge.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Value Added Grants Available from USDA

The U.S. Department of Agriculture is making grant money available for farmers who are looking to start value-added activities. The department is making $44 million available in competitive funding. Farmers can receive up to $75,000 in planning grants or $250,000 for capital grants. Grant money cannot exceed 50 percent of project costs.

Examples of planning activities include developing business plans or marketing studies. Actual capital expenses include processing costs and marketing and advertising expenses. Applications are due June 24. Contact your local Rural Development Office for information on how to apply for the grants.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

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State News Briefs

Stoltzfus Joins Penn State Extension for Food Safety Training

Penn State Extension hired an educator who will work with farmers across the state on complying with new federal food safety regulations. Jeff Stoltzfus will work out of Lancaster County, but will have a statewide focus in developing food safety education information for fruit and vegetable growers. The programs will help farmers meet standards set by the federal Food and Drug Administration under the Food Safety Modernization Act. Prior to joining Penn State, Stoltzfus spent 29 years in adult agricultural education, including with the Eastern Lancaster County School District. Stoltzfus is also the PVGA Second Vice President.

"Jeff Stoltzfus is uniquely qualified to help Extension address this high-priority area," said Dennis Calvin, director of Penn State Extension. "Over three decades, his teaching has focused on agronomy and horticulture production and more recently on farm food safety in response to increased buyer and now regulatory farm food-safety challenges."

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Local Income Tax Bill Clears Committee Hurdle

A bill that would that would make the filing of local income taxes more consistent with state and federal laws received support from the House Finance Committee. Senate Bill 356, introduced by Sen. Mike Folmer, would establish similar rules for payment and reporting of local income tax, including estimated tax reporting and payment, as established for state and federal income tax. Both the state and federal governments allow farmers to make one report and payment of estimated taxes, which is deferred until after the completion of the tax year. Farmers don't have the same option at the local level. Local tax laws also do not provide a "safe harbor" provision for the payment of estimated taxes. SB 356 would address both issues, along with making reporting and payment deadlines the same as state and federal. The bill would also limit the authority of a taxing district to require its taxpayers to use special tax forms and filing methods. The bill, which has already received Senate approval, now heads to the full House for consideration.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Sunday Hunting Being Considered Again

Pennsylvania Farm Bureau (PFB) restated its overwhelming opposition to any legislative effort that would directly or indirectly lead to the expansion of existing Sunday hunting laws in the Commonwealth, during testimony before the Senate Game & Fisheries Committee.

"Farm Bureau members have considered the issue of Sunday hunting on multiple occasions over the past two decades. Each time, farmers expressed their unequivocal opposition to any expansion efforts," said Joel Rotz, PFB State Government Affairs Senior Director. *In 2005 PVGA members also adopted a policy resolution opposing Sunday hunting.*

Although it opposes additional hunting on Sunday, PFB supports hunting and the role hunters play in managing wildlife in the state. In fact, Farm Bureau has worked for decades to build constructive relationships with the Pennsylvania Game Commission (PGC) and its staff to help keep privately-owned lands open and accessible to hunters.

"Farmers and other private landowners, who account for about 80% of all land used for hunting in the state, voluntarily allow hunters on their property to pursue game. It would be unfortunate if efforts to force more hunting on Sundays damaged positive relationships developed between hunters and landowners," added Rotz.

Farm Bureau notes that most Pennsylvanians support keeping the status quo on Sunday hunting, including many licensed hunters in the state. In addition, outdoor enthusiasts of all kinds support PFB's position.

"Several years ago, hikers, bikers, horseback riders, naturalists, bird watchers, fall foliage fans and others joined Pennsylvania Farm Bureau in opposing legislation that would have opened the door to expanded Sunday hunting," continued Rotz.

Farm Bureau has a history of actively embracing efforts to increase opportunities for youth hunters in Pennsylvania and has worked in conjunction with the PGC, sportsmen's groups and others to provide youngsters more chances to hunt.

Farmers have suggested that the state Game Commission allow youth hunting during the rifled deer season on the Friday and Saturday following Thanksgiving, when schools are closed. It is a rule change that the Commission can implement without action from the state General Assembly," concluded Rotz.

Philadelphia City Council To Consider Resolutions Encouraging Vertical Farming

The Philadelphia City Council will be considering resolutions to encourage the development of vertical farming operations in the city's many empty warehouse structures. Councilman Al Taubenberger, who holds a Penn State degree in agronomy, introduced the resolutions to encourage conversation about and interest in these enterprises. Vertical farms use artificial lighting in temperature-controlled buildings to grow crops, primarily greens, hydroponically. Secretary of Agriculture Russell Redding was on hand for a press conference highlighting the initiative.

Leaders envision creating a school to train those interested in this production method that would make use of empty buildings and unemployed workers in the city. They cite statistics that 36 square feet of vertical farming space can produce in a year what an acre of field space can using less water and electricity. There is also a shorter growing cycle required.

The resolutions will also encourage expansion of urban farm operations within the city on vacant plots of land.

*Information from an article by Julia Terruso in the **Philadelphia Inquirer.***

Finding the Next Generation of Agriculture Workers

Agriculture is poised to be a growing career destination for thousands of young adults coming out of school. However, there's a growing concern that there will not be enough workers to fill the expected 75,000 openings in agriculture in the coming years. That's why the Pennsylvania Department of Agriculture is researching current industry needs, and what schools can do to help fill the gap.

Much of that growth in agriculture will come in food manufacturing, which is a significant component of manufacturing in Pennsylvania, said Scott Sheely, Special Assistant for

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Workforce Development at the Pennsylvania Department of Agriculture. But there's a growing need for workers to have the expertise to help meet the technological changes happening in agriculture, he said.

"We need workers in areas where technology has grabbed hold and is reinventing everything," he said. "This would be dairy herdsmen, service technicians and similar jobs. These are jobs that will require training beyond high school."

Earlier this year, Sheely began working with the Department of Agriculture to examine how to attract quality candidates, and what changes need to occur at the education level so students can tackle careers in agriculture. In looking down the road, Sheely sees three tiers of jobs where a growing number of students and workers will need to fill:

The first tier, and the fewest in terms of potential job openings, are the agriculture science jobs such as engineers, agronomists and laboratory supervisors. There are already post high-school career paths in place for students to pursue.

The second tier is the farmers, landscape workers and equipment operators who work in food production plants.

The third tier, and the one with the largest looming shortfall, is one that requires some type of training past high school. These are the workers that will help meet the changing technology of agriculture.

While PDA and others are pushing agriculture careers to perspective students—and returning military—there is still a gap between current education training, and the needs of employers, Sheely said. What Sheely and others found is there is not any central organization for helping perspective students fit into a pipeline to fill those technological jobs—like maintenance technicians for agriculture equipment. Those types of jobs require mechanical aptitude, but also further training because of the advanced technology in farm equipment. Sheely said he would like to see partnerships formed between technology schools and employers to begin apprenticeship programs for those types of jobs. Much of the education focus has been on creating clear paths for those post-secondary jobs, ones like agronomy, that require a four-year degree, Sheely said. But the greatest need in the coming decade will be those that require a bit more training than high school or technical programs currently offer, he said. So it will be important for the state to create partnerships, like with veteran service organizations, to recruit quality candidates for agriculture jobs, Sheely said.

"We will need to reach out to some non-traditional sources to help us solve this issue," he said. "I don't know what we will find, we are trying and we are asking those questions."

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Penn State Research Creates Gene-Edited Mushroom

A Penn State researcher, who created a gene-edited mushroom, has received federal approval to move forward with potential commercial development of the mushroom.

The anti-browning mushroom, created by professor Yinong Yang, was developed using a gene-editing technique called CRISPR-Cas 9. The U.S. Department of Agriculture recently ruled the mushroom would not need agency approval, which opens the door for commercial development.

Unlike most genetically modified organisms, this mushroom does not contain DNA from other organisms, Yang said. Instead, the mushroom was developed by making a small deletion in a specific gene, he said. The technique Yang used is a relatively new way to modify an organisms' genes by delivering a DNA-cutting enzyme to a specific portion of the DNA. That creates a modification that can delete or replace certain DNA portions—and thereby altering traits. This technique was used to stop the production of enzymes that causes mushrooms to turn brown. This will result in a mushroom with a longer shelf life.

"This technology holds promise for precision breeding of crops with many desirable traits, such as low levels of food allergens or toxins, disease resistance, drought tolerance, and efficient nitrogen and phosphorous utilization," Yang said. "These agronomic traits not only help reduce pesticide, fertilizer and water usage, but also improve food quality and safety."

The ruling by the USDA could open the door for other GMO crops developed through the same gene-editing technique, Penn State reported. Yang said he hopes this technology changes the conversation around GMO technology.

*From the **Pennsylvania Agricultural Alliance Issues Update,** Penna. Farm Bureau, May 2016.*

Pennsylvania's First Hard Cider Guidebook Released

Penn State Extension is happy to announce the release of the Hard Cider Guidebook: A Producers Guide to Developing a Hard Cider Business in Pennsylvania made possible by the generous support provided by the Pennsylvania Apple Marketing Program, the State Horticultural Association of Pennsylvania and the USDA Specialty Crop Block Grant program.

Currently hard cider sales in cities throughout Pennsylvania rank 3rd, 6th and 7th as the highest selling cider markets in the nation when compared to percent of beer market sales. This burgeoning market, that saw sales skyrocket 71% in 2014, is continuing a steady and sustainable growth trend for 2015 and 2016. Compared with other food categories, cider is still soaring. With market trends following the craft beer market as well as the United Kingdom cider market, the U.S. cider industry is well poised to become a big player in the beverage arena and this means nurseries, apple growers, and custom cider presses will continue to have an opportunity to participate in the hard cider market.

The hard cider guide is designed to walk new cider makers through every step required to register their business with local, state, and federal regulatory agencies so they are able to open their doors faster. Many new cideries around the state have struggled with business registration and licensing because hard cider is still a regulatory gray area in Pennsylvania with many specific questions requiring a direct legal opinion from the licensing agent before the business is able to move forward.

With this guide, we hope to demystify the steps. It provides straightforward links and a timeline for all form submissions and direct contact information for cider maker frequently asked questions. It is our hope that his guide will aid in the growth of Pennsylvania's hard cider industry, providing renewed opportunities for process and fresh market apple growers.

An interactive, digital copy of the guide can be found at Penn State Extension's Hard Cider webpage at http://extension.psu.edu/business/farm/hard-cider .

*From Penn State as reported **Penna. Agricultural Alliance Issues Update,** Penna. Farm Bureau, March 2016.*

NEWS

Pollinator and Cover Crops Field Day Set for June 16

Squash bee in a pumpkin flower. Photo: Penn State

Join us for a morning of learning about who is pollinating your pumpkin and other squash crops and how we can help them with flowering cover crops. This free, in the field event, will be held on June 16 from 9:00 a.m. to 12:00 noon at the McDowell Farm which is operated by Brian Campbell, east of Bloomsburg. The farm is located on Hidlay Church Road.

The agenda is as follows:

9:00: Welcome to the workshop (John Esslinger, PSU Extension)

9:05: Welcome to Brian Campbell Farms – Overview of Brian Campbell Farms: what's grown here, what's been happening with cover crops & pollinator management (Brian Campbell)

9:15: Overview of Integrated Crop Pollination (Emily May, Xerces Society)

9:25: Pumpkin pollination
Pumpkin pollination overview/biology (Shelby Fleischer, PSU)
What bees pollinate PA pumpkins? Biology, ecology, and identification of bumble bees, squash bees, honey bees, other bees (Carley Miller/Erin Treanore, PSU)

10:10: Cover crops
Cover cropping overview (Bill Curran, PSU)
Cover cropping for cucurbit pollinators (Shelby, Erin, Carley)
Equipment for no-till cover cropping (Brian Campbell)
NRCS technical and financial assistance/cost-share options for pollinator habitat and cover crops (Jim Gillis, USDA-NRCS State Biologist)

11:10: Break

11:20: Integrated pest, pesticide, & pollinator management
Insect pests and pollinator management (Shelby Fleischer, PSU)
Disease management/fungicides (Beth Gugino, PSU)

Directions to the McDowell Farm are as follows: Take Interstate 80 to exit 241 A, Lime Ridge. Turn right at the light onto Lows Rd. Go straight on Lows Road until you go under Rt. 80, about 0.6 miles. Immediately after you go under the interstate turn left onto Hidlay Church Road. Go about 0.4 miles and the farm is on the right. You will pass the State Police Barracks about 0.2 miles before you get to the farm.

There is no fee to attend this event. However, pre-registration is requested.

For further information, contact Bridget Andrews at 570-316-6512 or bma157@psu.edu. To register go to http://extension.psu.edu/plants/vegetable-fruit/events/pollination-and-cover-crops-field-day.

NEWS

New Grower Study Circle Planned for Western PA on June 28

Penn State Extension is teaming up with beginning and establishing growers to offer study circles. A meeting is planned for western Pennsylvania growers on June 28, 2016, from 6:00 to 8:00 p.m. at Five Elements Farm, 405 Hogg Rd., Worthington, PA 16262 www.google.com/maps/place/405+Hogg+Rd,+Worthington,+PA+16262/@40.8065035,-79.655912,17z/data=!3m1!4b1!4m5!3m4!1s0x8834a0b2a07dad83:0x410fac06932c3841!8m2!3d40.8065035!4d-79.6537233.

Join the Western New and Establishing Farmer Study Circle Network for an evening focused on blueberries and organic vegetable production. Study circles allow you to learn from experienced farmers and experts, and compare notes with your peers. The meetings are free for farmers and open to all interested persons.

Discussion topics include: blueberries production — site selection, varieties, cover crops, soil management, and planting plus a tour of the farm's organic vegetable production.

There is no fee to attend and light refreshments will be provided. Registration is strongly encouraged, but walk-ins are okay. To register online, go to http://extension.psu.edu/business/start-farming/events/new-grower-study-circle-western-hub-20160628. To register by phone, call Lee Stivers mailto:ljs32@psu.edu at 724-228-6881.

GENERAL

Pennsylvania Growers Look at Alternatives for Expanding Business Opportunities

Thomas Butzler

Two of the most popular day-long workshops at the 2016 Mid-Atlantic Fruit and Vegetable Convention were the workshops on hops production and hard cider production.

Over 120 growers (and potential growers) packed the session on 'Hops Production 101' and maybe that shouldn't be too surprising. The Pennsylvania craft brewery industry has a $2 billion dollar economic impact according to 2012 data published by the National Brewers Association. This industry currently ranks fourth in the U.S. following California, Texas, and New York. The National Brewers Association also reports that Pennsylvania had 108 craft breweries in 2013 and that these breweries produced approximately 1.8 million barrels of craft beer in 2013 which ranked Pennsylvania as the second largest producer of craft beer in the U.S.

Hops are one of the most critical ingredients for the microbrewery industry and Pennsylvania's craft breweries cannot regularly source Pennsylvanian grown hops for use in their brewing process. The seven hour program covered everything from site selection and pre-plant considerations to varietal selection and economic concerns in an attempt to educate growers to meet the growing demand.

The last speaker of the day was from Troegs independent Brewing. They stated that the majority of their hops come from the west coast because of availability and consistency. Washington State alone grows over 27,000 acres of hops. We don't have a grasp on firm numbers, but Pennsylvania might have at most 100 to 200 acres in production. Not nearly enough to feed the growing craft brew industry.

That is not to say there is no room in Troegs operation for local hops. In fact, it is almost a necessity for their business model to have access to local hops. In order to stay competitive with national and local breweries for taste buds, they need to continually try new recipes and concoctions. Some fail but others develop a following and can be hard to purchase (think Mad Elf or Master of Pumpkins). Regardless of the product, they often try to source local hops to offer a unique taste to their new, smaller batch beers.

There was equal excitement with the potential of hard cider in Pennsylvania. Over 100 growers participated in the Hard Cider from Seed to Sip – Business and Production workshop that was occurring at the same time as the hops session. As with hops, the numbers for hard cider consumption have piqued grower's interest. Volume sales of hard cider have grown by 80% in the last four year in the United States. Pennsylvania ranks sixth in the number of hard cider operations in the United States, however, the number of consumers of hard cider in the U.S. grew to over 16 million by the end of 2014.

Issues on trends, varieties, and challenges of tree production within this industry were reviewed by speakers from Penn State, Cornell, and Redbyrd Orchard. Unlike the hops workshop, this course was held off-site where tasting was conducted to see how the different combinations of sugar content, tannins, and other factors give hard ciders their unique flavors and taste.

Mr. Butzler is with Penn State Extension in Clinton County. From the ***Vegetable, Small Fruit and Mushroom Production News,*** *Penn State Extension, extension.psu.edu/vegetable-fruit/news, February 22, 2016.*

GENERAL

Calibrate Your Sprayer Now—Here Is an Easy Way to Do It

Erdal Ozkan

Spraying season is just around the corner. Now is the time to pay attention to your sprayer. First, check all the components of the sprayer to make sure they are in working order. The next step in preparations for the season is to calibrate the sprayer. The only way you can achieve maximum accuracy from a sprayer is by calibrating it once before the spraying season starts, and recalibrating it frequently throughout the spraying season. While applying too little pesticide may result in ineffective pest control, too much pesticide wastes money, may damage the crop, and increases the potential risk of contaminating ground water and environment. The primary goal with calibration is to determine the actual rate of application in gallons per acre, then to make adjustments if the difference between the actual rate and the intended rate is greater or less than 5% of the intended rate. This is a recommended guideline by USEPA and USDA. Before starting calibration, make sure you have a good set of nozzles on the sprayer. Nozzles wear off through extended use, causing over application, or some nozzles may become plugged. Clean all the plugged nozzles. Check the output of all the nozzles for a given length of time at a given spray pressure. Compare output from each nozzle's output with the expected output shown in the nozzle catalog for that nozzle at the same pressure. Replace the nozzles showing an output error of more than 10% of the output of the new nozzle. Once you do this, now you are ready to calibrate your sprayer. Calibrating a boom sprayer is not as difficult as it sounds. There are several ways to calibrate a sprayer. Regardless of which method you choose, only three things are needed: a timer (or watch or smart phone timer app) showing seconds, a measuring tape, and a jar graduated in ounces. Here, I will describe perhaps the easiest of all the methods to calibrate a sprayer.

To calibrate a boom sprayer for broadcast applications using this method, follow these steps: 1. Fill the sprayer tank (at least half full) with water. 2. Run the sprayer, inspect it for leaks, and make sure all vital parts function properly. 3. Measure the distance in inches between the nozzles. 4. Measure an appropriate travel distance in the field based on this nozzle spacing. The appropriate distances for different nozzle spacing is as follows: 408 ft. for a 10-inch spacing, 272 ft. for a 15-inch spacing, 204 ft. for 20-inch spacing, 136 ft. for a 30-inch spacing, and 102 ft. for a 40-inch spacing. 5. Drive through the measured distance in the field at your normal spraying speed, and record the travel time in seconds. Repeat this procedure and average the two measurements. 6. With the sprayer parked, run the sprayer at the same pressure level and catch the output from each nozzle in a measuring jar for the travel time required in step 5 above. 7. Calculate the average nozzle output by adding the individual outputs and then dividing by the number of nozzles tested. The final average nozzle output in ounces you get is equal to the application rate in gallons per acre. For example, if you catch 15 ounces from a set of nozzles, the actual application rate of the sprayer is equal to 15 gallons per acre. 8. Compare the actual application rate with the recommended or intended rate. If the actual rate is more than 5 percent higher or

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GENERAL

EPA Revises the Worker Protection Standard (WPS)

Mary Ann Rose

The Worker Protection Standard (WPS) was first released in 1992 and protects agricultural workers and pesticide handlers at farms, forests, nurseries, and greenhouses. A revised rule was signed on September 28 by EPA administrator Barbara McCarthy. This 2015 revision is a comprehensive overhaul of the existing rule and the result of extensive stakeholder input over the past 10 years.

The revised rule is expected to significantly reduce pesticide exposure incidents, and is intended to give farm workers a level of protection from pesticides that is directly comparable to industrial worker protection afforded by the Occupational Safety and Health Administration (OSHA) hazardous chemical regulations. The new rule will be published in the federal register later this fall and will take effect 60 days later.

The changes are comprehensive. Pesticide handlers and early-entry workers now must be 18 years of age or older. Training content has been expanded to include new material. The grace period for new employees is eliminated, and workers must now receive training before they enter an area that has been treated with a pesticide with WPS labeling in the last 30 days. Agricultural workers must receive annual training instead of every five years, and a record of training must be kept. Being a pesticide handler no longer qualifies an individual to train workers; worker trainers must be certified applicators, EPA/Federal/ Tribal approved applicators, or have completed an EPA-approved train-the-trainer course.

There are new mandatory posting requirements if the pesticide restricted entry interval (REI) exceeds 48 hours for outside applications, or four hours for applications in enclosed spaces. Previously, only greenhouses were required to post signs at treated areas and other growers could choose between oral warnings or posting signs. Also, worker exclusion zones of up to 100 feet away from the application area may be required, depending on the type of application; previously, exclusion zones only applied in greenhouses and nurseries. Required amounts of decontamination supplies per worker or handler are now specified. When respirator use is required by the labeling, training, medical evaluation, fit testing, and record-keeping will be required (same as the OSHA requirement).

Safety Data Sheets (SDS) now must be posted with pesticide application information at the central display location, and the specific pesticide application information must be retained for two years after the REI expires. The pesticide application records are to be made available to workers, handlers, designated representatives, or medical personnel upon request. The farm owner exemption has been expanded to include all in-laws, grandparents, grandchildren, aunts, uncles, nieces, nephews, and first cousins.

The EPA's draft compliance schedule indicates that most changes will be required a year after the rule's effective date; the annual training with updated content will be required after two years. The "How to Comply" manual, which is a key reference for owners and managers, is projected to be available soon; the worker training materials (videos, manuals, workbooks, PowerPoints) are not expected to be available until mid-2017. For more information on the 2015 revisions to WPS, see the EPA website www2.epa.gov/pesticide-worker-safety/revisions-worker-protection-standard.

EPA Proposes Changes to the Certification and Training of Pesticide Applicators

The Environmental Protection Agency (EPA) has also proposed a minimum age (18) and stricter standards for certifying applicators of restricted use pesticides (RUPs). Private applicators are only required to be licensed in Ohio [and Pennsylvania] if they use RUPs. Much of what is proposed for the stricter federal standard is already required by Ohio Law; for example, Ohio pesticide applicators already take closed book exams, must recertify on a three-year schedule, and keep pesticide records. The proposed changes would significantly increase the recertification requirements for Ohio pesticide applicators. The EPA has proposed that all applicators will be required to take six units (50 minutes) of core plus three (private) or six (commercial) units per category every three years. An Ohio commercial applicator licensed in one category who is now required to take five hours of recertification would have to attend twelve 50-minute sessions every three years. An Ohio private applicator licensed in one category who now needs 3 hours of training to recertify would have to attend nine 50-minute sessions every three years. Applicators would be required to present identification at exams and recertification programs. For private applicators, the fumigation category would be split into soil and non-soil fumigation categories. There also would be an annual training requirement and minimum age of 18 for trained servicepersons, who under current Ohio law only require a single, verified training prior to occupational exposure to pesticides. Learn more about the proposal and certification for pesticide applicators: http://www2.epa.gov/pesticide-worker-safety/epaproposes-stronger-standards-people-applying-riskiest-pesticides

Ms. Rose is with the College of Food, Agriculture, and Environmental Sciences at The Ohio State Univ. From ***VegNet,*** *The Ohio State Univ. Ext., Vol. 23, No. 2, April 26, 2016.*

Calibrate Your Sprayer...

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lower than the recommended or intended rate, you must make adjustments in either the spray pressure or the travel speed or in both. For example, to increase the flow rate you will need to either slow down, or increase the spray pressure. The opposite is true when you need to reduce the application rate. As you make these changes, stay within proper and safe operating condition of the sprayer. Remember increased pressure will result in increasing the number of small, drift-prone droplets. 9. Repeat steps 5-8 above until the recommended application error of +5% or less is achieved.

Erdal Ozkan is Professor and Extension Agricultural Engineer at The Ohio State Univ. From ***VegNet,*** *The Ohio State Univ. Ext., Vol. 23, No. 3, May 3, 2016.*

NEWS

Harpster, Detwiler Selected for PSU Agriculture Trustees

Abe Harpster and Valarie Detwiler were selected to serve on the Penn State Board of Trustees representing agriculture.

Harpster, a current member of the board, is a 1994 graduate of Penn State and is the managing partner and owner of Evergreen Farms, one of the largest dairy farms in the northeast. Harpster is a member of Pennsylvania Farm Bureau, the Professional Dairy Managers of Pennsylvania and the Holstein Association. Harpster also volunteers as a guest lecturer in the College of Agricultural Sciences and hosts student classes at his family farm, along with offering internships for students.

Detwiler is a Blair County Farm Bureau member who serves as vice president and agriculture banking officer for Clearfield Bank & Trust. She and her husband also own Forshey's Ag & Industrial in Martinsburg, along with a beef and crop farm. Detwiler graduated from Penn State with a Bachelor of Science degree in accounting and a minor in legal environments of business. She serves on the Blair County Chamber of Commerce Farm City Committee, the Agriculture Committee of the Altoona Blair County Development Corporation and the Pennsylvania Banking Association's Agriculture and Rural Issues Advisory Committee. Detwiler replaces PVGA member Keith Eckel who has served as an agricultural trustee for 15 years and did not run for re-election.

Six individuals, elected by agriculture societies, and the Pennsylvania Department of Agriculture Secretary, serve on the Penn State Board of Trustees.

*From the **Farm Bureau Express,** Penna. Farm Bureau, May 6, 2016.*

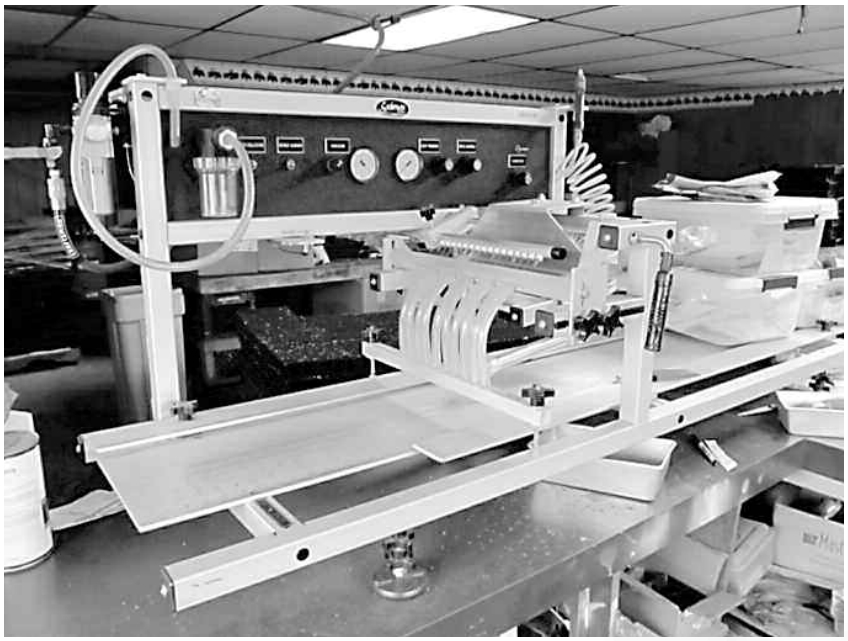
Educator's Ag Institute Coming in July

The Pennsylvania Friends of Agriculture Foundation is committed to growing agriculture literacy. And one way the foundation achieves that goal is by helping educators develop lesson plans based on agriculture. The foundation, a charitable organization supported by Pennsylvania Farm Bureau, is hosting the Educator's Ag Institute this summer at Penn State. This year's institute, planned for July 10-14, will give teachers an up close and personal look at farming practices, and how they can use agriculture as the basis for lesson plans. While at the conference, educators will tour a number of Penn State's agriculture facilities, participate in hands-on lessons and leave with a host of materials for use in their classrooms. The Educator's Ag Institute is open to new educators, along with those who have previously attended our Ag in the Classroom workshop. We will add new tours and features annually. Participants will also tour several area farms and hear from farmers on how they raise healthy crops and livestock. Educators can receive continuing education credits for attending. The Pennsylvania Friends of Agriculture Foundation is again looking for assistance from county Farm Bureaus to promote our workshop to local educators. We also encourage county Farm Bureaus to consider sponsoring educators to attend this worthwhile workshop. The Educator's Ag Institute helps spread positive and factual information about agriculture and expands consumer understanding about our industry. For more information, contact the foundation at 717-731-3555 or www.pfb.com/aginstitute.

*From the **Farm Bureau Express,** Penna. Farm Bureau, May 6, 2016.*

NEWS

On the Road... *(continued from page 2)*



The vacuum seeder.

'Fusion' lettuce heads, a cross between Romaine and leaf lettuces, were being grown in 3 gallon black polybags. The crop was transplanted in mid-February and after 4 weeks was ready to be harvested for sale to a local restaurant chain. New bags and soil are used for each crop and crop we saw was top quality. Danny has worked out his fertility program over his 30+ years of growing experience. Lettuce heads were also grown in a nutrient film technology (NFT) system. Originally most of his hydroponic crops were grown using NFT, but over the years Danny has switched most of his production to the polybag system.

Hydroponic lettuce grown in a polybag system ready for harvest.

This lettuce grown in a NFT system was being harvested.

Tomatoes were growing in white on black 5 gallon polybags filled with potting media spaced in a double staggered row with 16 inches between bags. Each bag had 2 plants and most plants were trained to one stem. However, Danny was experimenting this year with a 2-stemmed system for his cherry tomatoes as a way to increase his yields. A wide variety of cultivars were growing including large heirlooms, cherry tomatoes of various colors, plum tomatoes and slicers. Danny says that he's "always looking for something tastier." Bumble bees were used to pollinate the crop. All available space in every greenhouse was used with crops including kale, kohlrabi, spinach, radishes and bunching onions growing along the side and end walls.

Eggplants and peppers, both hot and bell types, were growing in the white on black 5 gallon polybags with two plants per bag. Plants were being trained to two stems. Rebar and wooden stakes were spaced about every 5 feet in a row of plants. A Florida weave system was going to be used to support the plants. Bumble bees were also being used to pollinate these crops. Insect pests in all of the greenhouses were managed primarily with biocontrols. Danny's attention to detail and expertise as a grower were quite evident on our visit. Plants were extremely uniform and the plant quality was excellent.

Being March, activity in the fields was minimal. An early crop of sweet corn had been planted under floating row covers and the straw over 3.5 acres of strawberries will be removed soon. Plastic much had been laid and drip irrigation installed over several rows in anticipation of spring planting.

A Styrofoam container tower system originally used for strawberries was being used to grow herbs in a greenhouse connected to the farm market. In the market were high quality displays of produce and processed goods and a wide variety of neat things including Danny's musical CDs. In addition to farming, Danny expresses his passion for music and performing via the

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On the Road... (continued from page 14)

One of the hydroponic tomato houses.

accordion and song and has produced several CDs. We enjoyed hearing "When Banana Skins Are Falling" at the end of our tour.

Yarnick's Farm is located at 155 Thomas Covered Bridge Road in Indiana, Pennsylvania. Their website is www.yarnicks-farm.com.

Dr. Sanchez and Dr. Lamont are with the Department of Plant Science at Penn State Univ. Mr. Pollock is with Penn State Extension in Indiana Co. From the ***Vegetable, Small Fruit and Mushroom Production News,*** *Penn State Extension, extension.psu.edu/vegetable-fruit/news, April 4, 2016.*

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NEWS

On the Road... *(continued from page 15)*

Danny is experimenting with a 2-stemmed training system for cherry tomatoes this year.

Once pepper plants break, they will be trained to 2-stems.

Basil, cilantro, mints and other herbs were growing in tower systems. The basil crop had just been harvested and was being replanted.

Hydroponic spinach growing along a sidewall in a greenhouse.

Stakes in the eggplant house will be used to implement the Florida weave training system.

Yarnick's Market had beautiful displays and a wide variety of products.

MARKETING

Updated Commercial Storage Reference Available

Agriculture Handbook 66 (AH-66) represents a complete revision and major expansion of the 1986 edition. It has been reorganized and now includes 17 Chapters and 138 Commodity Summaries written by nearly a hundred experts in 792 pages.

This version, like the previous editions of AH-66 in 1954, 1968, 1977, and 1986, presents summaries of current storage requirements of fresh fruits, vegetables, cut flowers, and other horticultural crops. However, this highly expanded version also includes information on quality characteristics, maturity indices, grading, packaging, precooling, retail display, chilling sensitivity, ethylene production and sensitivity, respiration rates, physiological disorders, postharvest pathology, quarantine issues, and suitability as fresh-cut product.

A large number of fruits and vegetables were added, as well as sections on food safety, nutritional quality, texture, and fresh-cut produce. The purpose of storing plant material is to lengthen the time it can be consumed or utilized. In doing so, it is critical to provide an environment that minimizes deterioration, maintains microbial safety, and retains other quality attributes. AH-66 provides guidelines and other important information for storing and handling horticultural commodities to accomplish this.

While supplies last, printed copies of this publication may be obtained at no cost from the USDA-ARS Food Quality Laboratory, Building 002, Room 117, 10300 Baltimore Avenue, Beltsville, MD 20705-2350.

Copies of this publication may be purchased in various formats (microfiche, photocopy, CD, and print on demand) from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, (800) 553-6847 http://www.ntis.gov/. You can also download your copy as a PDF file at http://ucanr.edu/datastoreFiles/234-2927.pdf.

*From the UC Davis Postharvest Technology Center April E-Newsletter as reprinted in the **Vegetable, Small Fruit and Mushroom Production News,** Penn State Extension, extension.psu.edu/vegetable-fruit/news, April 7, 2016.*

MARKETING

Eating 8 Strawberries a Day May Improve Heart, Mind and Body

Just one cup a day of America's favorite fruit, strawberries, benefits the entire body. Clinical research suggests that eating just a serving of eight medium strawberries a day may improve heart health, help manage diabetes, support brain health, and reduce the risk of some cancers. The American Diabetes Association identifies berries, including strawberries, as one of the top ten superfoods for a diabetes meal plan because they are low in sugar, packed with vitamins, antioxidants and dietary fiber. When added up, strawberries provide a nutritious "Whole in One" for the entire body.

There's nothing more simply sweet or delicious than a strawberry, but most of us don't eat as many as we should, according to experts. Last year, new research indicated that an eating plan called the Mediterranean-DASH Intervention for Neurodegenerative Delay, or "MIND", diet can lower your risk of Alzheimer's disease by more than one third – and the secret was a healthy daily dose of strawberries and blueberries. Since strawberries can play a role in protecting our brains as we age, there's never been a better time to resolve to eat more strawberries than in 2016.

Naturally low in sugar, strawberries provide a unique combination of essential nutrients, dietary fiber and phytochemicals. One serving of eight medium strawberries is just 45 calories and provides:

- More vitamin C per serving than an orange and 140% of the daily value
- A good source of fiber - 3 grams
- Folate and potassium, along with a variety of health-promoting phytochemicals
- Just 7 grams of sugar

Delicious in both sweet and savory dishes, or by themselves, strawberries are a versatile fruit that can be enjoyed in every meal of the day. By just adding strawberries to simple, everyday recipes, it's easy to boost nutrition and make a difference in overall health.

From California Strawberry Commission. February 3, 2016.

Ohio State Offers Direct Marketing Webinars

Ohio State University Extension is offering a series of monthly one-hour webinars throughout 2016. All the webinars begin at 12:00 noon. For the details visit http://directmarketing.osu.edu. The schedule for the rest of the year is:

June 16 – Product Labeling with Emily Adams
http://carmenconnect.osu.edu/productlabeling/

July 21 – Celebrate Ohio's Foods Week with Heather Neikirk and Patricia Barker
http://carmenconnect.osu.edu/local foodsweek/

August 13 – Produce Auctions with Brad Bergefurd http://carmenconnect.osu.edu/auctionsforproduce/

September 15 – Pricing Your Products with Megan Leffew
http://carmenconnect.osu.edu/pricingproducts/

October 20 – Cooperatively Marketing Your Products with Hannah Scott
http://carmenconnect.osu.edu/marketingyourproducts/

November 17 Using Facebook for Your Business with Duane Rigsby
http://carmenconnect.osu.edu/facebookforyourbusiness/

December 15 – Survey Results for Ohio Produce Marketers with the Direct Marketing Team
http://carmenconnect.osu.edu/surveyresultsformarketers/ .

Growers can view recordings of the previous seminars at go.osu.edu/DirectMarketingWebinars.

VEGETABLE PRODUCTION

Orondis, A New Fungicide from Syngenta

Andy Wyenandt

Syngenta Crop Protection released Orondis, a new fungicide with a new mode-of-action for use in vegetable production this past winter. Because of its registration date, Orondis was not included the 2016 Mid-Atlantic Commercial Vegetable Production Guide. Orondis (oxathiapiproplin, U15) targets the oxysterol binding protein that is a part of the cell wall. The active ingredient inhibits growth of the fungus as well as sporangia production and zoospore germination. Orondis has a low solubility (i.e., locally systemic), is translaminar; and will protect new growth. Orondis is currently sold as a co-pack with either mefenoxam (Orondis Gold), chlorothalonil (Orondis Opti), or mandipropamid (Orondis Ultra). Growers will be required to tank mix Orondis with its partner during 2016 season. In 2017, the partners will be formulated together. Importantly, Orondis will not receive an individual label in the US. Orondis has different use rates and restricted seasonal use. The label needs to be followed accordingly to help manage resistance development. Simply, if Orondis is applied via drip system, it cannot be used as a foliar spray (and visa-versa). If Orondis is applied as a foliar application it cannot be used via the drip. Thus, growers planning on using Orondis need to plan ahead of time and accordingly! The rates for Orondis and it counterpart will differ by crop, pathogen, and desired use (drip vs. foliar).

Orondis Products:

Orondis Gold 200 (oxathiapiprolin [OXTP] + mefenoxam, U15 + 4) — Growers using Orondis Gold will need refer to the Orondis Gold 200 (OXTP) label and the Orondis Gold B (mefenoxam) label.

Orondis Gold 200 targets damping-off caused pythium and/or phytophthora in cucurbits, fruiting vegetables, and leafy vegetables (excluding brassica's).

Orondis Opti (OXTP + chlorothalonil, U15 + M5) — Growers using Orondis Opti will need to refer to the Orondis Opti A (OTXP) label and the Orondis Opti B (chlorothalonil) label

Orondis Opti targets alternaria and downy mildew in Brassicas; alternaria, gummy stem blight, and downy mildew in cucurbits; early blight, late blight, botrytis, leaf mold, and anthracnose in tomato to name a few. See label for more specifics.

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Specialty Pepper and Processing Pepper Variety Trial

Gordon Johnson

In 2015 the University of Delaware conducted a pepper trial with types that are used for processing but also that could be used as fresh market specialty peppers. Included were sweet and hot banana types; hot and no-heat jalapenos; Italian and pimento peppers; and hot and sweet cherry peppers.

For the long Italian group, Crest Red, Crest Yellow, Carmen and Mama Mia Giallo were the highest yielding. Both Crest Yellow and Mama Mia Giallo are yellow types that compare to banana peppers and merit evaluation for processing, yielding over 20 tons per acre. Crest Red and Carmen are green-ripening-red Italian types. In the pimento group Tennessee Cheese and Pimento L. were the highest yielding at around 18 tons per acre.

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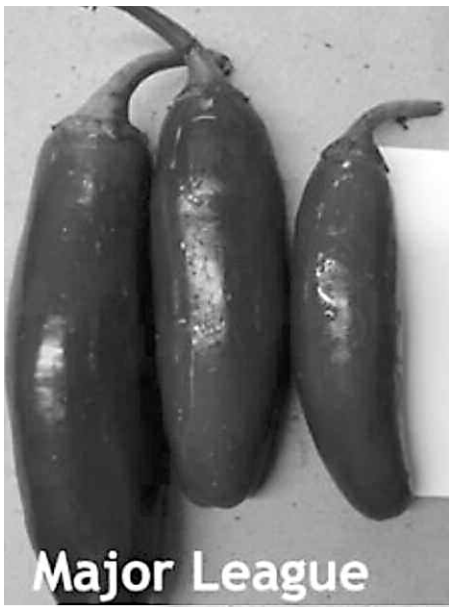
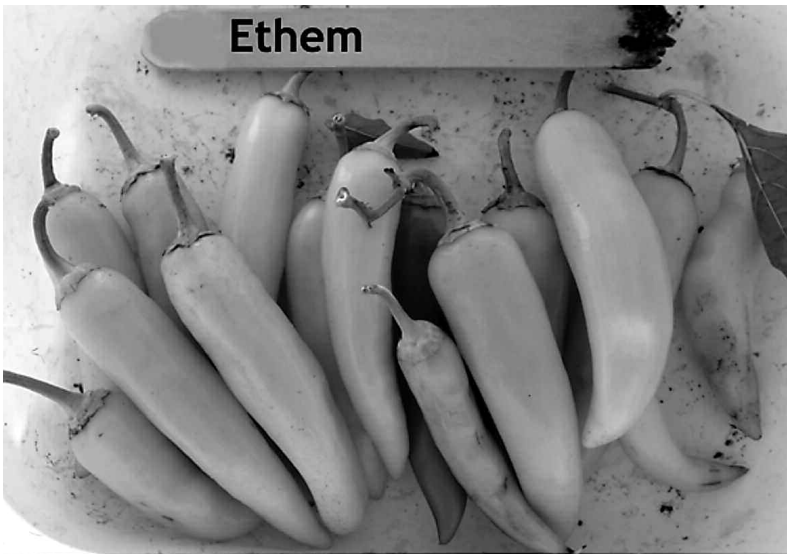
Specialty Pepper and... *(continued from page 19)*

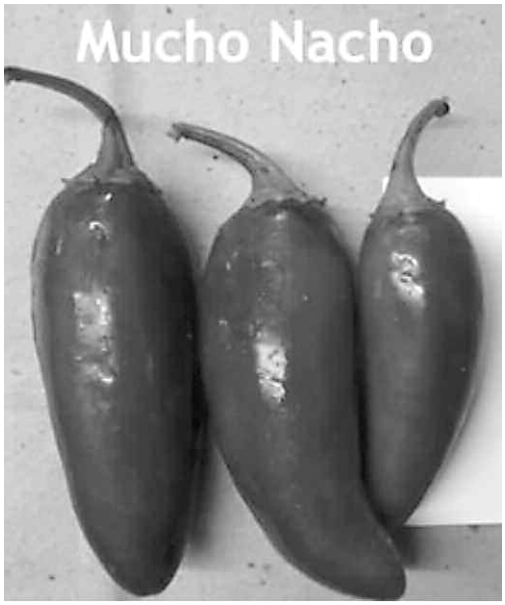
For the Jalapeno group, the top yielding varieties were Bilbao, Much Nacho, Rayo, Grande, El Jefe, Campeon, Felicity (non-hot type), Barajas, Compadre, Major League, and New Park. Barajas, Compadre, Campeon, and New Park had the least fruit cracking when green mature. Yields of the top Jalapenos ranged from 28 – 34 tons per acre.

In the Banana and Hungarian pepper group, Ethem, Budapest, Inferno, Sweet Savannah, Pageant, Sweet Arrow, Bounty, Superette Sweet, Boris, and Sopron were highest yielding ranging from 18-25 tons per acre. Ethem was particularly impressive for a sweet type and Budapest was the highest yielding hot type in the trial.

*Dr. Johnson is an extension vegetable and fruit specialist at the Univ. of Delaware. From the **Weekly Crop Update,** Univ. of Delaware Coop. Ext., Vol. 24, Issue 5, April 22, 2016.*







Orondis, A New... *(continued from page 18)*

Orondis Ultra (OXTP + mandipropamid, U15 + 40) – Growers using Orondis Ultra will need to refer to the Orondis Ultra A (OXTP) label and the Orondis Ultra B (mandipropamid) label. See labels for more specifics.

Orondis Ultra targets phytopthora blight and buckeye rot in fruiting vegetables; downy mildew and phytophthora in cucurbits; downy mildew in brassica's and onions to name a few. See labels for more specifics.

*Dr. Wyenandt is a specialist in vegetable pathology at Rutgers University. From the **Weekly Crop Update,** Univ. of Delaware Coop. Ext., Vol. 24, Issue 7, May 6, 2016.*

Growing Brussels Sprouts

Gordon Johnson

Consumer trends show an increase in consumption of Brussels sprouts offering potential market opportunities for Delaware growers. Brussels sprouts have been grown successfully on a commercial level in Delaware in past years. Most East Coast production currently is centered on Long Island in New York.

Brussels sprouts are in the cole crop group (*Brassica olearacea var. gemmifer*) and are closely related to cabbage, cauliflower, broccoli, kohlrabi, collards and kale. Brussels sprouts require a long growing season and are best grown as a summer planted and fall harvested crop in Delaware. Sprouts that are produced during hot periods will be bitter, therefore spring planting is not recommended.

Recommended varieties for our region include Dimitri (105 days) and Jade Cross E (85-97 days, our standard). Varieties for trial include Royal Marvel (85 days), Churchill (90 days), and Franklin (100 days). Nautic (120 days) and Diablo (110 days) are late varieties for extended fall harvest.

Brussels sprouts for sale on the stalk.

Brussels sprouts can be grown as transplants in 72-128 cell flats or can be field seeded in transplant beds for bare root transplants. Transplants should be started in May or early June and then field transplanted from the third week in June to the second week in July. Long season varieties should be planted by the end of June. Use shorter maturing varieties for later plantings. Brussels sprouts are transplanted in the field at a spacing of 36? between rows and 15-24? in the row. Double rows on white plastic mulch with drip irrigation is an option.

Brussels sprouts require 100-150 lbs/A of nitrogen split with 50-75 lbs/A at planting and the remainder as sidedressings. Apply 25-40 lbs/A of sulfur with nitrogen preplant applications and include 1.5-3.0 lbs/A of boron per acre and 0.2 lbs/A of molybdenum per acre as micronutrients.

Irrigation is required, with particular attention needed in summer months to achieve the equivalent of 1 inch of water per week during July, August, and September.

Herbicides for weed control in Brussels sprouts are limited compared to other cole crops – trifluralin, bensulide, DCPA, and napropamide are available for use. Broadleaf weed control will be limited and cultivation or hand hoeing may be necessary. Insect pests are similar to other cole crops and include caterpillars (imported cabbage worm, diamondback moth, cabbage looper, armyworms), aphids, thrips, and harlequin bug. Diseases include black rot, Alternaria leaf spot, and downy mildew.

The sprouts that are harvested are buds that grow to resemble miniature cabbage heads. They are produced in leaf axils along the main stem, which can grow up to 4 feet in height. To encourage sprout development, cut off the terminal bud of the plant (top the plant) when sprouts begin forming,

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VEGETABLE PRODUCTION

Palmer Amaranth: Don't Skimp on the Soil-Applied Herbicides

Mark VanGessel

If Palmer amaranth is a weed in your fields or in close proximity, you need to plan on using a soil-applied herbicide. But that alone is not enough. You also need to:

Apply those products close to planting time. Applying soil applied herbicides 10 days before planting soybeans often leads to significantly less Palmer amaranth control when evaluated at harvest than if the herbicide was applied right after planting the soybeans.

Use the full labeled rate. Reduced rates result in a shorter period of control and often lead to less weed control at harvest.

Assume you will need a postemergence herbicide application. Since most of the Palmer amaranth is resistant to glyphosate and group 2 herbicides, options for control are very limited. Products containing fomesafen have been the most consistent for postemergence control since it provides both contact activity as well as residual control. However, the rate of fomesafen needs to be at least 0.3 lbs active ingredient or the equivalent of 1.25 pts of Reflex.

*Dr. VanGessel is an extension weed specialist at the Univ. of Delaware. From the **Weekly Crop Update,** Univ. of Delaware Coop. Ext., Vol. 24, Issue 7, May 6, 2016.*

Growing Brussels... *(continued from page 21)*

which will be in September on Delmarva. Sprouts will take about 30 days from topping to harvest. Plants that are not topped will develop sprouts more slowly but will also produce over a longer season. Remove leaves on the lower part of the stem as the sprouts enlarge.

Sprouts for local sales can be harvested at a diameter of ? inch; whereas sprouts for wholesale markets should be allowed to get about 1? inch in diameter before harvesting. Sprouts are cut or snapped off of the stem and are often directly harvested into pint or quart containers or bags. Potential harvest period for our region is the end of September through November or a heavy freeze. Sales into December are possible, especially with supplemental row covers. Brussels sprouts are very cold tolerant (hardy down to 20°F) and flavor will improve (they will be less bitter) in the colder part of the harvest season. Yields will be 2-3 lbs/plant.

An alternative method of harvest is to cut entire stems once the majority of sprouts have sized, remove the leaves, and sell as sprouts on the stalk. This is a popular method for roadside stands and other direct markets and requires much less labor.

Brussels sprouts can be room cooled, forced air cooled, hydrocooled, vacuum cooled, or top iced. They should be brought to a temperature of 32-34°F and kept at high humidity (90-95%) for storage or transportation and benefit from top icing. Brussels sprouts have a relatively long shelf of 3-5 weeks if properly stored.

*Dr. Johnson is an extension vegetable and fruit specialist at the Univ. of Delaware. From the **Weekly Crop Update,** Univ. of Delaware Coop. Ext., Vol. 24, Issue 6, April 29, 2016.*

Odd Pest in Brassica Fields – Ants!

Jerry Brust

One odd thing I have seen, which has also been reported to me from a couple of farms, is collapsed plants, usually a broccoli or cabbage transplant, with ants where one would expect to find maggots or cutworms when digging up the plant. On some of these farms the ants had attacked the maggot or cutworm doing the damage, but on many of the farms it was the ants that were doing the damage. I have seen this before; almost always early in the season usually during cool wet periods. It is unclear if the ants are there because a nest was ripped apart during tillage operations and the ants are getting the nest back together or if it is a new nest trying to expand. Normally the ants tend to only disturb a few plants, but on a few farms 20-30% of the plants were damaged. Most of the ant activity is below ground so control is difficult if needed. If cutworms or cabbage maggots are found with the damaged plants the control recommendations in the 2016 Mid-Atlantic Commercial Vegetable Production Recommendations for them can be used and this will help with the ants too.

Organic growers are in a greater bind for control of ants. I have seen controls such as diatomaceous earth, mixtures of garlic and hot pepper, drenches of pyrethrums, boiling water poured onto the soil, and others, but none work very well, if at all. One thing that seems to work, but is labor intensive, is using some sort of ring that goes around the base of each plant. This ring could be some old PVC pipe that is cut to about 2-4 inches in length and is about 1-3 inches in diameter. Some growers use Vaseline at the top of the ring to further hinder the ants from entering the ring. If the ants are fairly deep below ground it will be difficult to get the ring deep enough to keep the ants out without restricting the roots of the growing plant.

*Dr. Brust is an IPM vegetable specialist at the Univ. of Maryland. From the **Weekly Crop Update,** Univ. of Delaware Coop. Ext., Vol. 24, Issue 8, May 13, 2016.*

Sandea Label Changes for Cucumbers/ Pickles

Mark VanGessel

There is a new Supplemental Label (24c) for Sandea on cucumbers allowing a 14 day pre-harvest interval (PHI), reduced from the current 21 day PHI. This label will eventually be on the full label, but growers wanting to use the 14 day PHI will have to have a copy of the supplemental label in their files. Copies of the 24c label are available on CDMS (http://www.cdms.fnet/Label-Database).

While the PHI has been shortened, the label still requires an early POST application window from after the 3 to 5 true leaves stage but before the first female flower appears. In addition, Sandea is labeled for preemergence application.

*Dr. VanGessel is an extension weed specialist at the Univ. of Delaware. From the **Weekly Crop Update,** Univ. of Delaware Coop. Ext., Vol. 24, Issue 9, May 20, 2016.*

Controlling Vegetable Diseases: It Takes a Village…

Sally Miller

Vegetable planting season outdoors has begun in the southern parts of Ohio and is about to start in the northern tier counties, so it is time to think about disease management programs. Last year was a pretty severe one for downy mildew in cucumbers, melons, squash and pumpkins, and for *Phytophthora* blight in peppers and cucurbits. Late blight of tomatoes and potatoes occurred sporadically, but can be a serious threat. These diseases are all promoted by rainy weather – downy mildew and late blight thrive under cool, overcast and rainy conditions, while *Phytophthora* blight needs warm temperatures and rain to develop and spread. None of these diseases are isolated to individual fields, and all can spread widely if not managed properly. An area-wide or community management approach is really important to protect crops from severe damage.

All of these diseases are spread beyond the plant that they are immediately infecting by produced thousands of sporangia, which in turn contain motile zoospores that, when released, can swim in anything from a thin film of water to a pond, river, or lake. Both sporangia and zoospores can infect plants.

In the case of downy mildew of cucumbers, for example, sporangia are produced in abundance on the lower surface of leaves overnight, then released into the air by midmorning under cool, humid conditions. The sporangia float in the air – if it is sunny and dry they are killed, if it is cool, overcast and humid they can move considerable distances. Rainfall brings them back down to land on some poor unsuspecting cucumber plant to start the cycle again. So this is why it is really important to keep production of sporangia to a minimum – not only to limit spread within a field, but to prevent spread to other fields near and far. Late blight behaves in a similar way, but the victims are tomatoes and potatoes.

The pathogen that causes *Phytophthora* blight of cucurbits and peppers is soilborne; special structures called oospores allow it to survive the winter in our climate. The pathogen causes both root rot and foliar and fruit blight, and long distance movement of sporangia occurs very easily in surface waters like irrigation ponds and rivers. Once this pathogen is established in a field, it can remain there for many years. So reducing the overall inoculum load – the number of zoospore-containing sporangia – is very important in reducing disease spread. Several fungicides have good activity against these diseases. *Phytophthora* blight-resistant pepper varieties and late blight-resistant tomatoes are available and they can slow down the progression of disease and reduce the production of inoculum. Cultural practices, including sanitation, are very important to reduce inoculum.

Several tips for preventing widespread movement of these pathogens are as follows:

- Plant disease-resistant varieties whenever possible * For downy mildew and late blight, follow subscribe to the Pennsylvania Vegetable IPM Weekly Update (call PVGA at 717-694-3596 or email us at pvga@pvga.org) for news of outbreaks of these diseases in Pennsylvania and begin

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VEGETABLE PRODUCTION

Wire Worms In Vegetable Crops

Corn wireworm is reported to be the most common wireworm species in the Northeast, but others may also be present including the tobacco wireworm, (*Conodoerus verspertinus*). Wireworm causes damage to vegetable crops including cabbage, corn, lettuce, pepper, potato and sweet potato, as well as field crops including field corn, sorghum, soybean, tobacco, and wheat.

Wireworms are attracted to CO2 released by germinating seeds, and can be a pest in large-seeded crops such as beans, peas and corn. Wireworms are the underground larval stage of click beetles, which are elongated, brown beetles that snap their bodies to make a clicking sound. Larvae are slender, yellow-brown, hard-shelled, and shiny, with three pairs of legs.

Wireworm larvae take 2-5 years to mature in soil. M. Spellman.

Adult click beetles emerge in May June. D. Ferro.

Life Cycle: Adults emerge from the soil in May and June, hiding during the day and flying at night. Each female can lay 200-400 eggs on the soil surface down to a depth of 6 inches, preferring grassy or weedy fields. Larvae hatch within 3-7 weeks and then spend 2-5 years in the soil before becoming an adult. They feed on other insects, roots, seeds, tubers, and other plant tissue. Wireworms prefer wet soils and moderate temperatures (at least 70°F); they migrate upwards in soil to reach warmer, moist soils, and down to avoid excessive cold, heat, drought, or saturated soils.

Damage: Due to their long and variable lifecycles, infested fields will likely contain wireworms at all stages of their life, and the larvae begin feeding at 1-2 years old. Wireworm problems occur most often in fields that were forested, in hay, pasture or sod, had grassy weeds, were in grain production, or were planted with high residue grass cover crops (eg. sorghum sudan or winter rye) within the past 3 years. Larvae feed on roots of many crops, where they can cause damage to growing seed lings or kill plants outright. Crops with starchy underground structures like potatoes can be rendered unmarketable due to tunneling caused by wireworms.

Avoidance and Control: Unfortunately, practices that enhance organic matter in the soil may actually worsen wireworm problems. The most important method of wireworm control is to avoid planting potatoes or other susceptible crops into infested fields. So, avoid fields with a long history of grasses. Rotating with buckwheat or brown mustard may help to reduce wireworm populations. In the spring, baits using corn, wheat or rolled oats placed 6 to 8 inches deep can be used to determine if wireworms are present, but this sampling method is labor intensive, and potatoes are often planted early spring, before such samples could be completed. Cultivation in July-August can be effective in killing pupae, but not larvae or adults. There are varieties of potato (Cherry red, Yukon Gold, Maris Piper, Whitu, Alamo, Anco) and sweet potato (Ruddy and Charlseton Scarlet) that have some resistance to wireworm damage. In one university trial, Beauregard and Covington sweet potato cultivars were found to be highly susceptible. This resistance may be due to high glycoalkaloid and low sugar content near the skin. A review of many insecticide trials over two decades indicated that organophosphate insecticides applied as a pre-plant broadcast or in-furrow treatment gave better control than carbamates, and that fipronil (phenyl pyrazol) and bifrenthrin (pyrethroid) were as effective as the organophosphates, but with less environmental impact and potential human safety concerns. For organic growers, the product PFR-97, containing the active ingredient *Isaria fumosorosea* Apopka Strain 97, a fungal bio-control which penetrates the wireworm larvae cuticle, may be used.

Resources:

Evaluation of Advanced Sweet potato Genotypes for Resistance to Soil Insect Pests, 2013. D. Michael Jackson and Howard F. Harrison USDA–ARS, U. S. Vegetable Laboratory, Charleston, SC. http://amt.oxfordjournals.org/content/amt/40/1/M1.full.pdf

Wireworm Biology and NonChemical Management in Potato in the Pacific Northwest. N. Andrews, M. Ambrosino, G. Fisher, and S.I. Rondon; Oregon State University, PNW 607 December 2008. https://catalog.extension.oregonstate. edu/sites/catalog.extension.oregonstate.edu/files/project/pdf/pnw607.pdf

Wireworm Pest management in Potatoes. Thomas P. Kuhar, Hélène B. Doughty, John Speese III, and Sara Reiter; Department of Entomology, Virginia Tech, Eastern Shore AREC, 2009. Pub#: 2812-1026. http://pubs.ext.vt.edu/2812/2812-1026/2812-1026.html

Updated by Katie Campbell-Nelson of the Univ. of Massachusetts Extension. From ***Vegetable Notes for Vegetable Farmers in Massachusetts,*** *Univ. of Mass. Ext., Vol. 28, No. 4, April 14, 2016.*

Controlling Vegetable...

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fungicide programs preventatively when disease occurrence is likely

- Maintain fungicide applications throughout the life of the crop. If a field is being abandoned, be sure to destroy the plants immediately to prevent continued inoculum production
- Do not keep cull piles of fruits and other plant materials affected by these diseases – inoculum will continue to be produced as long as the plants are alive. Sporangia of the Phytophthora blight pathogen can easily move from infected plants in cull piles to waterways during rainstorms.

The economic viability of a community demands cooperation by all of its members. Plant diseases do not occur in isolation and it is up to the community to police itself in matters of crop health, for everyone's benefit. For more information, see: Ohio Veggie Disease News (u.osu.edu/miller.769)

Dr. Miller is with the Department of Plant Pathology at The Ohio State Univ. From ***VegNet,*** *The Ohio State Univ. Ext., Vol. 23, No. 1, April 19, 2016.*

POTATO PRODUCTION

Dickeya dianthicola in Potatoes, Update for 2016

Nathan Kleczewski

In 2014 and 2015, growers in many parts of the region started to notice black leg symptoms popping up in fields. However, careful inspection of plants suggested that this was not your typical black leg, which is a seed piece issue resulting from contamination with *Pectobacterium* followed by excessively wet growing conditions. In the case of the atypical black leg, growers noticed significant blanking after planting, and rapid wilting of plants during the season, particularly after very hot weather. Infected stems were not mushy, as typically observed with black leg, but were dry, black, and hollow. Tubers were macerated and had a tapioca-like appearance, but did not have the typical, pungent smell associated with *Pectobacterium*-derived black leg. Samples from affected fields from several states were sent for assessment via DNA based techniques, and in all cases, the bacterial pathogen associated with plants was *Dickeya dianthicola*. Only special, DNA-based techniques can accurately identify *D. dianthicola*.

D.dianthicola is an organism that has been present in the United States for many years, but only recently have we observed it causing issues in potatoes at a significant level. The organism can degrade potato tubers much more rapidly than *Pectobacterium,* and at much lower levels of infestation. Infection and growth of the bacterium can also occur at temperatures above what is considered optimal for *Pectobacterium.* Like typical blackleg, the main route of entry for the disease is contaminated seed pieces. Under wet conditions the bacterium can rot the mother tuber, resulting in poor emergence. In some instances the mother tuber may not rot completely, but may be colonized by the bacterium, which then moves into the stem. When this occurs you may observe black lesions developing from the soil line, hollow, dry stems, and wilted plants. Very wet conditions can cause the bacterium to spread in the soil to new tubers, which may rot under favorable conditions.

Data from other countries indicates that the bacterium will not likely persist in the absence of a host. Crops such as brassicas and onions may serve as alternate hosts. Other species of *Dickeya* can colonize corn, but there is no published data indicating that is the case for this particular species. Currently, all samples taken from symptomatic potatoes have been identified as *D. dianthicola*. There are plans to conduct surveys to better assess the population of *Dickeya* species associated with potatoes in the region and other areas in the United States where potatoes are grown.

Now that many growers are planting their potatoes they should be aware of the potential to see *D. dianthicola* in their fields this season. The following best management practices should be followed:

- Save your seed certificate. This will be useful in tracking down infested lots should this be an issue in the future.
- Avoid over irrigation, flooding
- Plant to maximize airflow
- Use a balanced fertilization program
- Ensure adequate calcium levels in soil
- Scout fields regularly. Initial symptoms will be areas of poor emergence. Symptoms later in the season include rapid wilting and death of plants, especially following very hot conditions. You may observe rotted tubers underneath symptomatic plants. If you see symptoms, contact your Penn State Extension educator.

If you have symptomatic fields and ***D. dianthicola*** is suspected/confirmed:

- Harvest these fields last
- Disinfest equipment with quaternary ammonium. Typical sanitation products such as bleach will not work against Dickeya spp.
- If potatoes are to be stored, ensure rooms are adequately ventilated and are maintaining cool temperatures
- Avoid including brassicas or onions in rotations
- Manage volunteer potatoes
- Avoid placing cull piles near fields or production areas
- Check your seed certificate.

Dr. Kleczewski is an extension specialist in plant pathology at the Univ. of Delaware. From the ***Weekly Crop Update,*** *Univ. of Delaware Coop. Ext., Vol. 24, Issue 2, April 1, 2016.*

BERRY PRODUCTION

Mites (Two Types) Found in Strawberries

Gerald Brust

While visiting some strawberry fields this past week I ran into a few areas that had two spotted spider mite (TSSM) feeding. These were mostly in fields that had been using row cover. Spider mites *Tetranychus urticae* are well adapted to high-temperatures and can complete their life cycle in as little as 7 days when temperatures are >80°F. The temperatures under row covers in the early part of our season were much above normal and rainfall was below normal, leaving conditions hot and dry, which permitted spider mites (if present) to develop quickly. Warm dry conditions, along with the nitrogen content of leaves, greatly influence TSSM reproduction rate. Applying excessive nitrogen favors spider mite outbreaks.

The two spotted spider mite overwinters in the soil as mated adult females, which are an orange-red color (with two dark spots) (Fig. 1) rather than the typical mid-summer color of

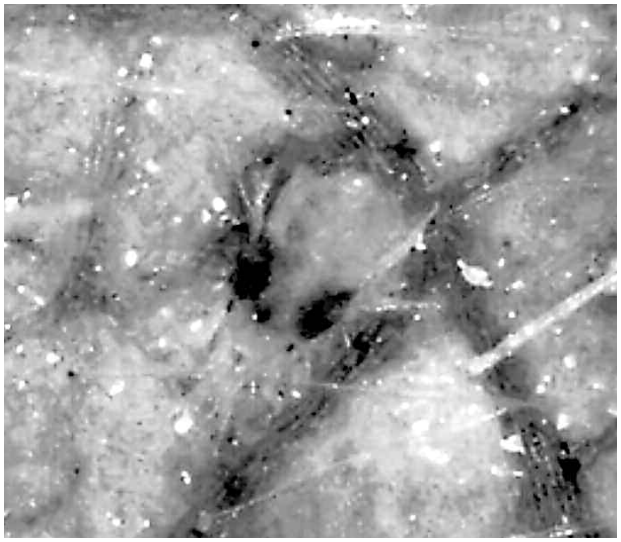

Figure 1. Overwintered female TSSM

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Mites (Two Types)... *(continued from page 25)*

Figure 2. Heavy cyclamen mite feeding (top) and lighter feeding (bottom)

pale green or light yellow. When they emerge from the soil in the spring, they begin to feed and lay eggs.

Possible thresholds for TSSM are when 25% of leaves are infested or when there are 10 to 20 mites per leaflet. None of the fields I was in needed any treatments, but did need to be watched. If we have the wet weather and seasonable temperatures they are predicting for later in the week and next week this will greatly reduce the threat of TSSM. However, if warranted there are many excellent miticides available for two spotted spider mite control in strawberry that are listed in The Mid-Atlantic Vegetable Production Recommendations Guide.

The second mite species I found surprised me a bit as I have only seen it in strawberry one other time and that was a number of years ago. This was the Cyclamen mite *Steneotarsonemus pallidus,* which is extremely hard to see, even with magnification. The leaves I looked at in a couple of matted-row strawberry fields I thought were just cold damaged (most were), but looking at the undersides of some the leaves showed sand grain-like particles and some stippling marks. Upon inspection with a 20X hand lens and later with a dissecting scope I found cyclamen mites. These mites are microscopic, semi-transparent, oval and white to yellowish-brown. Eggs are oval, translucent and large, about half the size of an adult. Adults overwinter in the crowns of strawberry plants and females lay eggs along the midribs of the unfolding strawberry leaves.

In general, infested plants show weak growth and yellow, crinkled leaves. Younger leaves will not reach their normal size and are often crinkled and at times hairier than normal. As with two spotted spider mite feeding, there are often white stippling marks on the older leaves with the older growth becoming distorted, curled and off-color (Fig. 2). If feeding damage is heavy enough flower buds can drop. Fruit that develops from infested

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BERRY PRODUCTION

Mites (Two Types)... *(continued from page 26)*

buds are small and dry. Whole plants may have a bronze cast, which occurs due to fluids injected by the mites (Fig. 3).

Figure 3. Cyclamen mite damage later in the season

I do not think the cyclamen mites pose any real problem for our strawberry fields, possibly for a few plants, but not a field. Because the mites are so small and located down in the crown they are extremely difficult to control even when chemicals can get to them. My guess is we have these mites in many of our matted-row strawberry fields and at times in our plasticulture fields every year, but no one has looked for them or seen much tell-tale damage from them. I only mention it now because it was a bit of a surprise to find them and it is something growers should be aware of potentially being in their field.

Mites, especially the TSSM and at times broad mites which are tarsonemid mites like cyclamen mites, seem to becoming a more consistent problem in many of our vegetable crops over the last 10 years or so. Not sure of the reason, just have noticed them occurring more regularly than before and something we all need to keep an eye on.

*Dr. Brust is an extension IPM specialist at the Univ. of Maryland. From the **Weekly Crop Update,** Univ. of Delaware Coop. Ext., Vol. 24, Issue 6, April 29, 2016.*

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GREENHOUSE PRODUCTION

Flower Trial Field Day Set for July 21

The annual Penn State **Flower Trial Field Day** is your opportunity to see, firsthand, the newest annual and perennial flowers that will be offered to garden center and landscape clients next spring. This year's field day will be Thursday, July 21, 2016, from 7:30 a.m. to 4:30 p.m. at the Southeast Agricultural Research and Extension Center, 1446 Auction Road, Manheim, PA 17545.

There will be guided tours of the trials by Sinclair Adam, Trial Gardens Director. The keynote speaker will be Dr. Allan Armitage, internationally renowned expert on herbaceous plants. Dr. Armitage will present **"The Industry Through One Man's Eyes."** Virginia Brubaker with Griffith Greenhouse Supplies will speak on the top insect pests that trouble commercial greenhouses and John Bray with Penn State Extension will cover the information found on Material Safety Data Sheets (MSDS) qualifying attendees for two category and two core pesticide applicator update training credits.

Registration deadline is Monday, July 18, 2016. For further information or to register, go to http://extension.psu.edu/plants/green-industry/events and select "Flower Trial Field Day". You can also call 717-270-4391.

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