



# WEEKLY CROP UPDATE

UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

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## WCU Subscription Options for 2020: Mail, Fax, Email or Text

Welcome to the first issue of WCU for the 2020 season. The next WCU for 2020 will be issued on April 3. WCU will then be posted on the web and sent to mail and fax subscribers by 4:30 p.m. each Friday until September 25. The cost of mail or fax subscription is \$40. You can subscribe by returning the form at the back of this issue.

The WCU is also available for free online as a printable PDF or blog format at:  
<https://sites.udel.edu/weeklilycropupdate/>.

For those who access the newsletter via the internet we send a weekly email reminder which will let you know when the WCU has been posted online, provide a link directly to the current issue, and give you a taste of the headlines. If you would like to receive the email reminder, enter your email address in the sidebar of the WCU blog page. If you experience problems with the online WCU please contact me at [emmalea@udel.edu](mailto:emmalea@udel.edu) or (302)-856-7303.

I will also send out a text message each week when a new issue is posted. The message will be brief, and the text message distribution list will not be used for other announcements except those of an urgent nature (i.e. pest or disease alerts). If you would like to receive the text reminder please send your name, number and cell phone carrier to me at the above email address or send a message to 302-233-4719.

*Emmalea Ernest*

## Vegetable Crops

**Vegetable Crop Insect Scouting** - *David Owens, Extension Entomologist,*  
[owensd@udel.edu](mailto:owensd@udel.edu)

### Peas

Seedcorn maggot flies are emerging and will be active on our moderately warm days. Fields at greatest risk for seedcorn maggot problems are those in which a cover crop or manure has been recently applied and incorporated.

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**Spring Planted Cover Crops for Vegetable Rotations** - *Gordon Johnson, Extension Vegetable & Fruit Specialist;* [gcjohn@udel.edu](mailto:gcjohn@udel.edu)

One principle of managing for improved soil health is that you should always have a crop growing on the soil. This will maintain or add organic matter, provide benefits from the action of growing roots, and recycle nutrients.

Where fall cover crops were not planted due to late harvest, spring cover crops can be planted and provide soil health benefits where vegetables are not scheduled until late May or the month of June.

The most common grass family cover crop options for mid/late March or early April planting are spring oats, and annual ryegrass. Plant oats 90-120 lbs per acre and annual ryegrass at 20-30 lbs per acre.

Mustard family (Brassica) cover crop options for late March or early April planting include yellow mustards, white mustards, brown mustards and oriental mustards. Companies also offer blends of several mustard species. Mustards are generally planted at 10-20 lbs per acre. Rapeseed and canola are another mustard family option for spring planting at 5-12 lbs per acre. Forage radishes and oilseed radishes can also be spring planted at a rate of 4-10 lbs per acre. Arugula is an additional mustard family option planted at 4-7 lbs per acre.

In the legume family, field peas are another option for spring planting. One type of field pea is the winter pea which is often fall planted in our area but can be spring planted. It has smaller seed so the seeding rate is 30-60 lbs per acre. Canadian field peas are larger seeded and used as a spring cover crop planted alone at 120-140 lbs per acre. An often-forgotten spring seeded legume crop that can also be used is red clover. Red clover can be frost seeded into small grains, seeded alone, or mixed with spring oats or annual ryegrass. Seeding rates for pure stands would be 10-16 lbs per acre, for mixtures 6-10 lbs per acre.

Mixtures also can be used. Research has shown that you get the best soil health benefits from mixing three species from different plant families. Commonly a grass is mixed with a legume and with a mustard family crop. Examples would be spring oats, field peas, and forage radish; annual ryegrass, red clover, and mustard. Reduce seeding rates of each component when using in mixtures. Companies often offer preblended mixture for these uses.

Many of the mustards have biofumigation potential. When allowed to grow to early flower stage and then incorporated into the soil, they release compounds that act as natural fumigants, reducing soil borne disease organisms. Some biofumigant mustard varieties include Pacific Gold, Idagold, and Kodiak. Biofumigant blends include Caliente and Mighty Mustard. Biofumigant rapeseed varieties include Dwarf Essex and Bonar.

To use as a biofumigant, mustards will be allowed to go to full growth (early flowering) and then are chopped with a flail chopper (cut

fine) and incorporated with a tractor mounted rototiller or other tillage tool for complete incorporation. Chopping releases the biofumigant compounds in the plants. Ideally the area then should be rolled with a cultipacker or overhead irrigated to seal in the biofumigant.



G Johnson, University of Delaware

Finely chopped biofumigant cover crop ready for incorporation. Chopping releases the biofumigant compounds in the plants.



G Johnson, University of Delaware

Spring planted cover crops shown including mustards, rapeseed, radishes, and arugula.

When used as a biofumigant, mustards should be grown as a crop. You need to add 60-100 lbs of nitrogen per acre to produce the maximum biomass. Nitrogen is also required to produce spring oats and annual ryegrass at similar rates. When planting mixtures with peas, nitrogen rates should be reduced.

Several spring-planted cover crops have been used specifically to address nematode infested soils. This includes “Nemat” arugula and “Image” radish. Mustards such as Caliente 199 have been used to reduce *Phytophthora* infestations.

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### Hot Water Seed Treatment to Prevent Disease in Vegetables -Gordon Johnson, Extension Vegetable & Fruit Specialist; [gcjohn@udel.edu](mailto:gcjohn@udel.edu)

We have had an increase in bacterial diseases of vegetables that are seed transmitted such as black rot of cole crops.

Hot water treatment of seeds is a method to eliminate certain seed borne diseases of vegetable crops. This treatment has the benefit of killing pathogens that may be found on and within the seed coat.

#### **From the Mid Atlantic Commercial Vegetable Production Recommendations:**

“Seed heat-treatment follows a strict time and temperature protocol, and is best done with thermostatically controlled water baths. Two baths are required: one for pre-heating and a second for the effective pathogen killing temperature. The initial pre-heat treatment is 10 minutes at 100°F (38°C). The effective temperature treatment and time in the second bath differ between crops; protocols for several important crops are listed in Table E-10. Immediately after removal from the second bath, seeds should be rinsed with cool water to stop the heating process and dried on screen or paper. Seeds may be re-dusted with fungicide if desired. Pelleted seed is not recommended for heat treatment. Heat treat only seed that will be used during the current season. See crop sections for specific seed treatment recommendations.”

List of seeds that can be treated, treatment times and temperatures, and diseases controlled can be found at <https://ag.umass.edu/vegetable/news/hot-water-treatment-of-seeds>

The University of Delaware Extension Vegetable program has the equipment to hot water treat

seeds. Please contact Gordon Johnson [gcjohn@udel.edu](mailto:gcjohn@udel.edu) or Emmalea Ernest [emmalea@udel.edu](mailto:emmalea@udel.edu) to arrange to hot water treat seeds.

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### Heat Tolerant Vegetable Varieties - Emmalea Ernest, Associate Scientist - Vegetable Crops; [emmalea@udel.edu](mailto:emmalea@udel.edu)

As you make your variety selections for 2020 you might want to consider trying a few heat tolerant varieties. Some vegetables, such as eggplant, okra and sweet potatoes, are inherently very heat tolerant. In other crops there are notable differences in heat tolerance between varieties and some varieties have been selected particularly for heat tolerance. In Delaware we can experience temperatures that exceed what is ideal for certain vegetables, especially from late June through August. Try targeting heat tolerant varieties in the planting window that is most likely to be exposed to high temperatures in the crop’s heat susceptible growth stage.

#### **Snap Beans**

In the early flowering stage, snap beans are susceptible to yield and quality loss from high night temperatures (above 70 °F). High night temperatures damage pollen in developing buds and prevent pollen release when the flowers open. As a result, seeds do not set. Pods with low seed set may drop off the plant or mature with only a few seeds, resulting in deformed, unmarketable pods. Over the past three years I have evaluated snap bean varieties for heat tolerance in Delaware and the following varieties maintain yield and quality during heat events: **PV 857, Annihilator and Dominator** (round podded) and **Usambara** (flat podded).



Unstressed or heat tolerant bean plants produce full-length pods with even seed development (left). Moderate heat stress can result in pods

with some missing seeds (center). Bean plants affected by heat stress produce shorter, deformed, unmarketable pods (right).

### Tomatoes

High temperatures can interrupt fruit set in tomatoes, again by interfering with pollination. Even in varieties with good “heat set”, high temperatures can cause fruit quality problems like yellow shoulders and internal white tissue. Gordon Johnson conducted a heat stressed tomato variety trial in 2019. The varieties **Red Bounty** and **STM2255** maintained the best yield and quality under heat stress in that trial.

### Lettuce

Lettuce bolts and becomes bitter when exposed to high temperatures. Some varieties are slower to bolt but may still develop a bitter flavor when exposed to heat. Based trials I did in 2012, 2018 and 2019 the following varieties resist bolting and are slow to develop a bitter flavor. (All lettuce will eventually bolt and turn bitter.) *Butterhead*: **Forlina**, **Salanova® Green Butter**, **Salanova® Red Butter**, **Skyphos**; *Leaf*: **Starfighter**; *Romaine*: **Dov** and **Arroyo**.



Heat tolerant lettuce varieties.



A variety trial where many varieties bolted due to high temperatures, but some did not.

### Sweet Corn

In trials I conducted in 2019 the following sweet corn varieties performed well under heat stress conditions for a mid-July harvest (planted on May 21): *Bicolor Supersweet*: **Affection** and **Nirvana**; *White Supersweet*: **Xtra Tender 378A** and **XTH 3174**; *White SE*: **Whiteout** and **Mattapoisette**

### Broccoli

Based on research done by Thomas Björkman and Karen Pearson at Cornell University, broccoli is most susceptible to heat stress (temps > 90 °F) in the early head formation stage. The susceptible window includes the 10 days prior to when a tiny crown of 5-10 mm is visible at the center of the plant. Once the crown is visible, the most susceptible stage has passed. Prolonged heat exposure in the susceptible window results in uneven head development, leafy heads and variable bead size. Delaware variety trials found that varieties that are more tolerant of heat stress include **Eastern Crown** and **Millennium**. Regional trials in 2019 showed that **Abrams** performed well under hotter conditions.

### Brussels Sprouts

In trials done by Gordon Johnson in 2018 and 2019 **Hestia**, **Marte**, and **Dagan** Brussels sprouts varieties produced well under southern Delaware’s stressful growing conditions.

## New Survey to Shed Light on Trade-offs Between Food Safety and Conservation Practices on Produce Farms in the Eastern United States

Recent studies have suggested that on-farm food safety practices can have unexpected economic and ecological impacts. Despite the potential for negative consequences, limited data are available on the costs and benefits of implementing specific practices. Comanaging farms for food safety and sustainability is further complicated because farms are linked to adjacent environments so that management decisions can have unexpected ecological, economic and food safety consequences. A comprehensive understanding of the links between agricultural and adjacent environments is key to ensuring environmental health, sustainability, and food safety. A new survey, funded by the Atkinson Center at Cornell University, promises to give a clearer picture of these linkages and what this means for growers.

Specifically, to meet this need, a new collaborative research project between researchers at Cornell University, the University of California, and the University of Rochester is reaching out to growers in the Eastern United States to fill out a survey on food safety. The survey asks for information on monetary and labor costs associated with on-farm food safety, agricultural water use and treatment, pest management and conservation practices. The survey also provides an opportunity for participating farmers to report any obstacles or difficulties they have encountered. Filling out the survey should take about 20-30 minutes, and all responses are confidential.

The project will not only identify grower costs associated with various farm practices, the information generated will also be integrated, using big data analytics, into models to quantify trade-offs between different grower aims including food safety, conservation and profit. This model will then be used to develop guidelines for how to best co-manage produce farms for these aims. The survey is a key part of this process, as it will clarify how costs vary among farms of different sizes, cropping systems/types, location, and organic certification status. The research will also shed

light on how voluntary third-party audits, conservation incentives and other initiatives affect growers.

The results of this survey should point to opportunities for improving food safety and conservation on-farms while reducing costs for growers.

If you grow vegetables, fruits, or nuts in the Eastern United States and would like to participate in this effort, please visit the following website: [insert]. The person most directly in charge of managing food safety should take the survey. All responses are confidential and reported results will be fully anonymized.

The first 300 people to complete the survey will be eligible for a \$15 e-gift cards. The survey will be open through May 31st, 2020.

For further information, please contact the project directors, Dr. Daniel Weller ([Daniel\\_Weller@urmc.rochester.edu](mailto:Daniel_Weller@urmc.rochester.edu)), Aaron Adalja ([aaron.adalja@cornell.edu](mailto:aaron.adalja@cornell.edu)), or Patrick Baur ([pbaur@berkeley.edu](mailto:pbaur@berkeley.edu)).

## Fruit Crops

**Establishing Blueberries - Plan Now for a 2021 Planting** -Gordon Johnson, *Extension Vegetable & Fruit Specialist*; [gcjohn@udel.edu](mailto:gcjohn@udel.edu)

There has been an increase in interest in growing blueberries on Delmarva and we have had several new plantings in the region in recent years.

Blueberries are very specific in the type of soil conditions in which they will grow. The ideal blueberry soil will be sandy but with high levels of organic matter, it will have a pH between 4.5 and 5.0, it will be well drained in the surface soil. Soils on Delmarva have those characteristics are limited.

There are six keys to success with blueberries:

- 1) Blueberries cannot tolerate standing water at any time and site selection is important. Choose well drained sites and consider raising beds or ridges to improve drainage where needed.
- 2) Increase soil organic matter before planting

- 3) Drop soil pH to between 4.5 and 5.0 and bring phosphorus and potassium up to optimum or high levels prior to planting
- 4) Put organic material in the planting hole during planting
- 5) Mulch the plants well after planting
- 6) Install a drip irrigation system

A common mistake that is made is to plant blueberries before the soil has been modified. Normal agricultural soils will have a pH around 6.0 and organic matter below 2%. Blueberries will not grow well in these conditions. It is advised to plan at least one year in advance to modify the soil.

To increase organic matter, plant cover crops and consider amending the soil with additional organic sources such as pine bark fines. Do not use composts that have high pH.

The pH of the soil will need to be lowered on most soils. This is done by adding elemental sulfur at recommended rates according to soil type and the amount of pH drop required. Sulfur additions need to be done the year before planting. It takes several months for the full reaction to take place. You cannot apply sulfur in the year of planting and expect the soil pH to be in the acceptable range for good first year growth.

After soil has been properly modified, you can plant the blueberries. This is normally done in the spring. Fall plantings are possible but there are higher risks to losses in harsh winters. When laying out plantings and deciding on between row spacing, think about how you will apply mulch and pesticides and whether you will be using netting to exclude birds.

Another key to planting blueberries is to add organic matter to the planting hole. The most common practice for smaller plantings is to use one gallon of moistened peat moss in each hole. Other organic materials can be substituted but they should be low in pH and should be at least partially decomposed. Most commercial composts are not acceptable because the pH is too high for blueberries. Also, composts made with manures as a component may have too high of salt levels and can injure the blueberry roots.

After planting, blueberries should be mulched heavily. Blueberry roots are shallow and need to be protected from high soil temperatures. In addition, the mulch will conserve soil moisture and provide additional organic matter as it slowly decomposes. The best mulch materials are high in lignin and acidic in nature. Pine bark is ideal but is often not readily available. Aged wood chips or ground yard waste that has been aged makes good mulch. Sawdust must be partially decomposed before use to avoid nitrogen deficiencies. Avoid mulches that increase pH.

Drip irrigation is recommended for blueberries and is best placed under the mulch. Because blueberries are shallow rooted, frequent irrigations during our hot summers will be needed to get the plants established and growing well. Overhead irrigation can also work if designed properly.

Do not put fertilizers in the plant hole and avoid adding any fertilizer until plants are established. In the first year, blueberries will need about 20 pounds of nitrogen and nitrogen should be in the form of ammonium sulfate or urea. Do not use N sources that contain nitrate. Do not use fertilizers containing chloride (such as KCl - potash).

Place plant orders the year prior to planting. Plants may come as bare root plants, large liners, or potted plants. Large liners and pots have less risk of planting losses. Choose northern high bush varieties recommended for our region. Current recommendations can be found in the Mid-Atlantic Berry Guide. The University of Delaware has conducted trials with additional varieties (many southern highbush types). Contact Emmalea Ernest ([emmalea@udel.edu](mailto:emmalea@udel.edu)) for results and additional recommendations.

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**False Spring Concerns - Again** - Gordon Johnson, *Extension Vegetable & Fruit Specialist*; [gjohn@udel.edu](mailto:gjohn@udel.edu)

Some plums, and apricots have started to bloom four weeks ahead of normal. Other fruits such as strawberries may be blooming ahead of schedule in plasticulture systems. These fruit crops are at great risk of losses due to freeze events. Other

fruits such as pears, cherries, and blueberries may also flower early and be at risk.

Crops coming into bloom will be exposed to the potential of freezing temperatures throughout the rest of March and April.



G Johnson, University of Delaware  
Plum with high percentage of open flowers.



G Johnson, University of Delaware  
Pluot in full flower.

Normally, the average date of the last frost in Delaware is somewhere between April 20-25. We still have seven weeks of worry ahead for our fruiting crops.

For all these fruit crops the most susceptible stage of injury is when flowers have just opened. Open blooms are damaged at 32-34 °F. Closed buds have higher cold tolerance as do small fruit. For most fruits, critical temperature for losses after fruits have formed is 28-30 °F.

Frost and freeze protection methods vary with fruits and the type of freeze expected. Advective freezes occur with freezing

temperatures and high winds. This is the most difficult to protect against. For strawberries, two layers of floating row covers may be the most effective strategy for advective freezes. Double covers have been shown to be more effective than single heavy covers in this case. Irrigation along with double covers can provide even more protection if done properly.

Radiation (or radiant) freezes occur on cold, still nights. In this case cold air is near the ground and warmer air is above. Wind machines and helicopters have been successfully used to stir the air and raise the temperatures in orchards in this case. Row covers in strawberries will protect against radiation freezes too. Other options are over the top sprinklers, ground sprinklers, and heaters.

Over the top sprinkling is commonly used for frost protection but it has to be done properly. How this works is that as clear ice forms on plants heat is released. For frost protection, overhead sprinkler systems are designed to deliver 0.1 to 0.2 acre-inches of water per hour. This method can be used for radiant freeze or frost protection when wind speeds are low and temperatures 24 °F or above. The key is to keep ice formation occurring through the night and continue through melt in the morning. Remember that initially, until ice starts forming, there will actually be evaporative cooling of the plant. The latent heat of fusion (water freezing) will release heat (approximately 144 BTUs/lb of water), whereas evaporative cooling will absorb heat from the plant (absorbing approximately 1,044 BTUs/lb of water) and lower plant temperatures. Therefore, irrigation must start well above critical temperatures. Also, the volume of water needed must to be matched with the expected temperature drop and wind speed. In addition, uniformity of water application is critical. This is difficult to do in high wind situations. In orchards, under-tree sprinklers can also be used to release heat.

Heaters that are placed throughout an orchard will add heat. Large numbers of small heaters are preferred (40 per acre). This is accomplished with fuel oil fired heaters, gas/propane heaters, or burn barrels using wood (check with regulatory agencies before using open burning in barrels). Heaters are much more efficient and

less are required if they are used in conjunction with wind machines.

Frost protection fans above an orchard or vineyard mix the warmer air above the inversion layer with the colder air at ground level to protect against radiation frosts. These large fans can be permanently installed and will cover as much as 10 acres. Another type of fan is placed at ground level and pushes the cold air upward, again achieving mixing. Portable fans are also available.

## Agronomic Crops

**Agronomic Crop Insect Scouting** - David Owens, Extension Entomologist, [owensd@udel.edu](mailto:owensd@udel.edu)

### Small Grains

Be on the lookout for aphids, especially in malting barley if you haven't yet gone over fields. While most fields we have sampled or that scouts have sampled have very low numbers, one field at the Carvel REC had moderately high populations for this time of year, with spots approaching 40 aphids per foot. There was also a mix of greenbug, birdcherry oat aphid, and English grain aphid. It is impossible to know if these populations will continue building, or if populations in fields will build before natural enemies take them out. Last year in wheat, we did not see a yield response to extremely high (150+ aphids/ft) but brief (<2 weeks) populations. In malt barley there was a slight trend, though not significant, for lower yield in the check plots with no reduction in quality.

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**UD Laboratory Studies Suggest that Humic/Fulvic Acid Additives are Not Effective at Increasing P Bioavailability** - Lauren Mosesso, DENIN Graduate Fellow; Amy Shober, Professor and Nutrient Management/Environmental Quality Extension Specialist; [ashober@udel.edu](mailto:ashober@udel.edu) and Jarrod O. Miller, Assistant Professor and Extension Agronomist, [jarrod@udel.edu](mailto:jarrod@udel.edu)

Many Delmarva farmers indicate that they experience issues with phosphorus (P) uptake

with corn and winter wheat due cool soil temperatures early in the growing season. In some cases, these crops can benefit from the addition of starter P fertilizers. Humic/fulvic acid additives have been successful in some greenhouse studies to increase P bioavailability for wheat uptake (Tahir *et al.*, 2011), while unsuccessful for others (Jones *et al.*, 2007). We evaluated two humic acid (HA) additives in a laboratory incubation study to determine if these additives could increase P plant availability and eliminate the need for starter P fertilizer on high P Delmarva soils.

Two HA additive products were added to five Delmarva soils with Mehlich 3 P concentrations >150 FIV at rates of 0, 20, 330, or 650 gal ac<sup>-1</sup>. The applied rates were much higher than recommended on the product labels. The experiment was carried out with three replications for each treatment. Soils were maintained under moist conditions (approximately 80% of field capacity). We collected soil subsamples from each cup at 0, 7, 14, and 56 days after HA additives were applied and analyzed for water extractable P and Mehlich-3 P.

In the absence of growing plants, we found no significant changes in water extractable P or Mehlich-3 P when measured at 7, 14, or 56 after HA application. These results were similar for all soils evaluated. As such, we have no evidence to support the claim that humic acid soil additives will enhance P solubility when applied Delmarva fields with Mehlich 3 concentrations exceeding 150 FIV. However, we recognize that results may vary in systems with actively growing crops.

### References

Tahir, M., M. Khurshid, M. Khan, M. Abbasi, and M. Kazmi. 2011. Lignite-Derived Humic Acid Effect on Growth of Wheat Plants in Different Soils. *Pedosphere* 21(1):124-131.

Jones, C., J. Jacobsen, and A. Mugaas. 2007. Effect of Low-Rate Commercial Humic Acid on Phosphorus Availability, Micronutrient Uptake, and Spring Wheat Yield, *Communications in Soil Science and Plant Analysis*, 38(7-8): 921-933, DOI: 10.1080/00103620701277817.

# General

## Insecticide Updates - David Owens, Extension Entomologist, [owensd@udel.edu](mailto:owensd@udel.edu)

The miticide Zeal SC is receiving a 1 use/year supplemental label for sweet corn.

Corteva has announced plans to cease chlorpyrifos manufacture at the end of 2020. As far as I am aware, generic manufacturers will still be making it, but don't expect them to defend registrations as vigorously. Maryland's state senate just approved legislation banning the active ingredient; that legislation goes to the MD house which had approved a similar measure last year.

EPA has announced proposed interim registration decisions regarding neonicotinoid insecticides; they can be found here:

<https://www.epa.gov/pollinator-protection/proposed-interim-registration-review-decision-neonicotinoids>. Probably the most significant changes are to fruiting

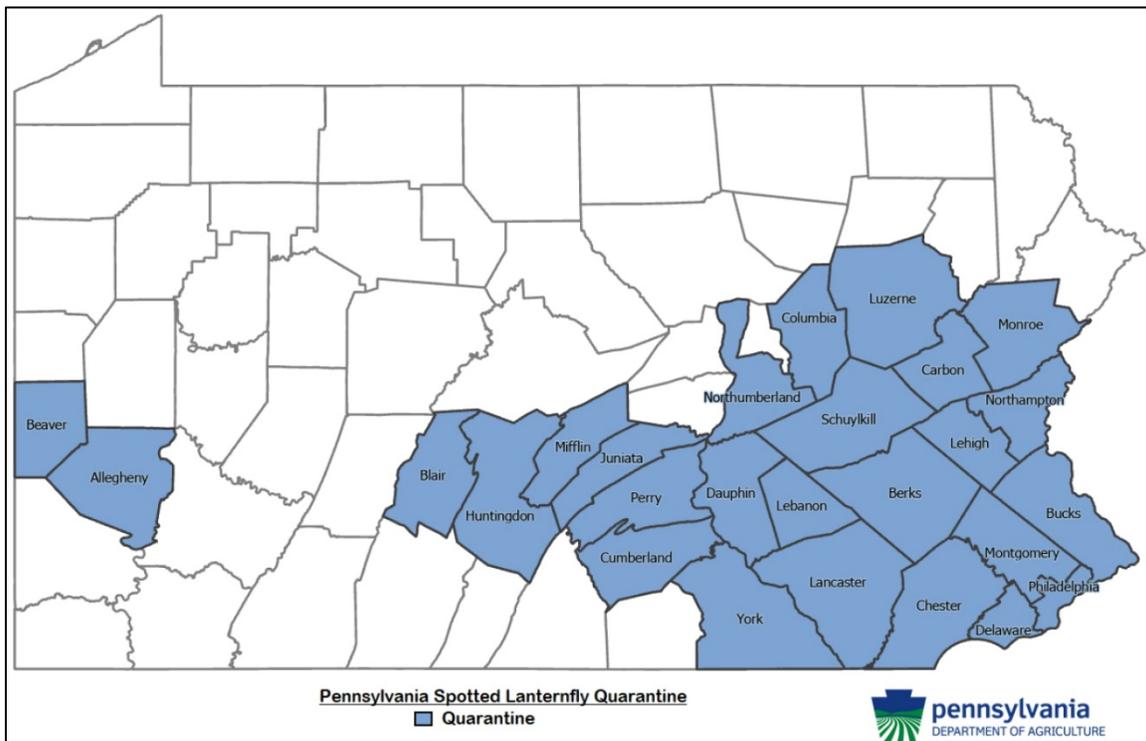
vegetables and cucurbit use for imidacloprid and thiamethoxam/clothianidin. Application would be prohibited on fruiting vegetables 5 days after transplant and on cucurbits either after the first true leaf emerges or after vining. Your comments and input are critical in this process. Without your input, they will go into effect. If these proposed decisions have any impact on your business operation, you can submit comments here:

<https://www.regulations.gov/document?D=EPA-HQ-OPP-2008-0844-1608>. Comments are due April 3. You can also reach out to me and I can incorporate them into my own comments.

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## PA Spotted Lanternfly Quarantine Expanded - David Owens, Extension Entomologist, [owensd@udel.edu](mailto:owensd@udel.edu)

Twelve more counties in PA are now under quarantine: Allegheny, Beaver, Blair, Columbia, Cumberland, Huntingdon, Juniata, Luzerne, Mifflin, Northumberland, Perry, and York.



# Announcements

## Delaware FSMA: Produce Safety Rule Training

March 24, 2020 8:00 a.m.–4:30 p.m.  
University of Delaware, Carvel Research and  
Education Center  
16483 County Seat Highway  
Georgetown, DE 19947

### This seven-hour course will cover:

1. Introduction to Produce Safety
2. Worker Health, Hygiene, and Training
3. Soil Amendments
4. Wildlife, Domesticated Animals, and Land Use
5. Agricultural Water (Part I: Production Water; Part II: Postharvest Water)
6. Postharvest Handling and Sanitation
7. How to Develop a Farm Food Safety Plan and Recall Planning

In addition to learning about produce safety best practices, parts of the FSMA Produce Safety Rule requirements are outlined within each module. There will be time for questions and discussion, so participants should come prepared to share their experiences and produce safety questions.

This one-day course will provide a foundation of Good Agricultural Practices (GAPs), FSMA Produce Safety Rule requirements, and information on how to develop a farm food safety plan. Individuals who participate in this course are expected to gain a basic understanding of microorganisms relevant to produce safety and where they may be found on the farm, how to identify microbial risks, practices that reduce risks, how to begin implementing produce safety practices on the farm, and parts of a farm food safety plan and the first steps that should be taken to begin writing one. There will also be updates on produce food safety research and findings, as well as information on On-Farm Readiness Reviews and how to sign up for one.

### Who Should Attend?

Fruit and vegetable growers and others interested in learning about produce safety, Good Agricultural Practices (GAPs), and the Food Safety Modernization Act (FSMA) Produce Safety Rule. The Produce Safety Alliance Grower Training Course is one way to satisfy the FSMA Produce Safety Rule requirement outlined in § 112.22(c) that requires ‘At least one supervisor from the farm must complete food safety training at

least equivalent to the standardized curriculum recognized by the FDA’.

Please note: If your farm is covered under FSMA it is required that at least one supervisor from the farm attends a PSA training course and receives an AFDO certificate of training. Exempt fruit and vegetable growers are still encouraged to attend. Also, the traditional University of Delaware Food Safety Training (GHP/GAP Training) is not a substitute for this course.

After attending the entire course, participants will be eligible to receive a certificate from the Association of Food and Drug Officials (AFDO) that verifies they have completed the training course. To receive an AFDO certificate, a participant must be present for the entire training and submit the appropriate paperwork.

Register by e-mailing Anna Wicks at [anna.wicks@delaware.gov](mailto:anna.wicks@delaware.gov)

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## Commercial Vegetable Production Recommendations Available

The 2020/2021 Mid-Atlantic Commercial Vegetable Production Recommendations have been posted online at:  
<https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/commercial-crops/vegetable-crops/midatlantic-vegetable-recommendations/>

The online pdf version is free.

Print copies may be purchased at all three county Extension offices. Print copies cost \$20 for members of the Fruit and Vegetable Growers Association of Delaware and \$25 for non-members.

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## Delaware Urban Growers Forum

Saturday, March 14, 2020 8:00 a.m.-12:00 noon  
Del Tech. University Wilmington Campus  
530 East 4th Street, Wilmington, DE 19801

Come out to the first annual DE Urban Growers Forum to learn from local experts how to grow fresh veggies in the city, what to do with your harvest, and techniques for increasing your yield!

This family-friendly event is FREE and offers something for gardeners of ALL experience levels.

Presented by Delaware Urban Farm & Food Coalition

On-site parking available and accessible by bus.

**Learn about:**

- Container Gardening
- Composting
- DIY Herbal Remedies
- Managing Pests
- Preserving Your Harvest
- Grant Writing
- and More!

**[Register Online](#)**

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**Southern Maryland Small Fruit Workshop**

Wednesday, March 18, 2020 8:30 a.m.-4:00 p.m.

Baden Fire Department

16608 Brandywine Road, Brandywine, MD 20613

**Agenda**

8:30 **Registration and Morning Refreshments**

9:00 **Welcome and Overview of Program**

Ben Beale, Alan Leslie, Joe Fiola and Dave Myers

9:15 **Optimizing the Strawberry Plasticulture System in the Mid-Atlantic**

Roy Flanagan: Extension Agent, Virginia Beach, Virginia Cooperative Extension

10:15 **Break**

10:30 **Weed Control in Brambles and Vineyards**

Wayne Mitchem: Southern Region Small Fruit Consortium Coordinator and Fruit Weed Management Specialist, North Carolina State University

11:30 **Panel Discussion- Future of the Small Fruit Industry in the Mid-Atlantic**

Wayne Mitchem, NCSU, Roy Flanagan, Virginia Tech, Joe Fiola, UMD

12:15 **Catered Lunch:** Fried Chicken, Mashed Potatoes, Green Beans, Fruit Salad, Peaches, and Ice Cream Cake

1:00 **Wine and Table Grape Varietals for Coastal Plain Soils**

Joe Fiola: Extension Specialist for Small Fruit and Viticulture, University of Maryland

1:30 **Bramble Production Methods in Warmer Regions**

Wayne Mitchem, NCSU

2:00 **Identification and Management of Spotted Wing Drosophila-Hands on Exercise**

Kelly Hamby: Asst. Professor and Extension Specialist, University of Maryland

2:45 **Putting Together a Comprehensive Disease Control Program for Small Fruit**

Mengjun Hu: Asst. Professor and Small Fruit Pathologist, University of Maryland

3:30 **Pesticide and Nutrient Voucher Updates-Spotted Lanternfly Update**

So MD Agent Team

4:00 **Adjourn**

Presented by the Southern Maryland Agricultural Development Commission, University of Maryland Extension and Rural Maryland Council.

*Registration is free. To register call your local Southern Maryland Extension office or 301-475-4484.*

*In case of inclement weather, a message with the status of the meeting will be available at 301-475-4484.*

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**Stormwater Workshop Series**

Carvel Research and Education Center  
16483 County Seat Hwy  
Georgetown, DE

The public is invited to attend a free stormwater workshop series being held at the Carvel Research and Education Center in Georgetown, DE. This series is made possible by the Sussex Conservation District (SCD), University of Delaware Cooperative Extension (UDCE), and the Delaware Department of Natural Resources and Environmental Control (DNREC).

The workshops are designed to present property owners, homeowner associations and property maintenance companies a holistic approach to stormwater and open space management. SCD, UDCE and DNREC will provide technical resources to aid in

the management and enhancement of your community. Each workshop will address seasonal issues many property owners and communities encounter.

[April 16, 2020](#) - Overview of drainage in Delaware, open space management and wildlife management.

[June 18, 2020](#) - Preventative maintenance, irrigation management and water conservation practices.

[Aug. 13, 2020](#) - Water quality, invasive species management and stormwater facility winterization tips.

Each workshop will be held from 9 a.m. to noon, at the Carvel Research and Education Center in Georgetown, Del. Registration will begin at 8:30 a.m. and light refreshments will be served.

For more information or to register, visit [www.sussexconservation.org/events](http://www.sussexconservation.org/events) or call Siobhan Kelley, communications and outreach specialist at SCD, 302-856-2105 ext. 122.

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Weather Summary	
Carvel Research and Education Center Georgetown, DE	
Week of February 27 to March 4, 2019	
<b>Rainfall:</b>	
0.20 inch: February 27	
0.06 inch: March 2	
<b>Air Temperature:</b>	
Highs ranged from 64°F on March 2 to 37°F on February 29.	
Lows ranged from 43°F on March 3 to 24°F on March 1	
<b>Soil Temperature:</b>	
43.5°F average	
Additional Delaware weather data is available at <a href="http://www.deos.udel.edu/data/">http://www.deos.udel.edu/data/</a>	

*Weekly Crop Update is compiled and edited by Emmalea Ernest, Associate Scientist - Vegetable Crops*



*Weekly Vegetable and Agronomic Crops Newsletter*  
*April 3 through September 25, 2020*

<http://extension.udel.edu/weekcropupdate/>

Timely Production Topics | Current Ag Issues | Disease and Insect Outbreaks  
Latest Weed, Insect and Disease Control Options  
Pasture and Forage Management | Weather Summary  
Upcoming Meetings and Events

Articles by Cooperative Extension specialists and agents from University of Delaware and University of Maryland.

The Weekly Crop Update is available by:

**First Class Mail (\$40/season), Fax (\$40/season), or on the Internet (FREE)**

The Weekly Crop Update is mailed, faxed and posted on the internet each Friday by 4:30 pm.

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To receive the WCU by First Class Mail or Fax, complete the form below and return to:  
Emmalea Ernest, Carvel Research & Education Center  
16483 County Seat Highway, Georgetown, DE 19947

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