



# WEEKLY CROP UPDATE

UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

Volume 27, Issue 9

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## Vegetable Crops

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

### Cucurbits

Cucumber beetles continue to move into fields. It is important to base a treatment decision from 5 to 10 locations per field. I visited a couple of fields this week where cucumber beetle activity was heavy, but only on a couple of rows and a few plants within those rows. For watermelon, we use an action threshold of 2 beetles per plant for young transplants. Other states use a threshold of 5 beetles per plant once vines start running. Unlike watermelon, cucurbits such as summer squash, cucumber, and cantaloupes are susceptible to bacterial wilt. These crops are also more attractive to cucumber beetle than watermelon, thus you may need to treat them more often or see more aggressive cucumber beetle populations. Pumpkins are not very susceptible once they have two true leaves (not counting the cotyledons), and so a seed treatment should provide sufficient control to avoid bacterial wilt. We have been relying heavily on the Group 4A chemistry early, products like imidacloprid, acetamiprid, and thiamethoxam, followed by Group 3 pyrethroids late. There are a couple of other chemistries that may provide good cucumber beetle control: Lannate, Sevin XLR plus, and two diamides, Exirel and Harvanta. Our group is in the process of collecting cucumber beetles from across the

area to test susceptibility to the commonly used insecticides. If you have a treatable population, please let me know before or within 1 day of treating and I will gladly take some cucumber beetles off of your hands. Thanks!

Spider mites can be found in some fields, most likely coming in with the transplants. At this stage, you will see the light yellow stippling on the leaves. This stippling is not as apparent on older melons once the leaves thicken up until there are very high populations underneath the leaf. Agrimek or other Abamectin containing Group 6 products can provide excellent control and are systemic miticides. They are hard on bees, so if you are using them during the season, the best window for using them is prior to bee arrival and to apply in the evening when pollinators are not as active.

### Sweet Corn

Sweet corn pheromone and blacklight traps are checked twice weekly on Mondays and Thursdays. By Tuesday and Friday morning, data is uploaded to our website: <https://agdev.anr.udel.edu/trap/trap.php>. For reference, action thresholds based off of blacklight and pheromone trap can be found here: <http://extension.udel.edu/ag/insect-management/insect-trapping-program/action-thresholds-for-silk-stage-sweet-corn/>. Silking sweet corn is highly attractive to moths, a trap that is nearby but not adjacent to sweet corn may not be entirely representative of the population in your block. Thursday trap counts are as follows:

Trap Location	BLT - CEW	Pheromone CEW
	3 nights total catch	
Dover		0
Harrington	1	0
Milford	0	4
Rising Sun	0	1
Wyoming	0	1
Bridgeville	0	0
Concord	2	1
Georgetown	0	0
Greenwood	2	
Laurel	2	10
Seaford	2	2
Harbeson		0
Trap Pond	0	0

**Pollination in Seedless Watermelons and Honey Bee Placement, Bumble Bees as Pollinators** - Gordon Johnson, Extension Vegetable & Fruit Specialist; [gcjohn@udel.edu](mailto:gcjohn@udel.edu)

A female watermelon flower will need around 500-1000 pollen grains to be fertilized effectively. This will require a minimum of 8 visits by a honey bee for seeded watermelons. In seedless watermelon more visits will be required. The pollen produced by seedless watermelons is not viable. To fertilize seedless watermelon, pollen must be transferred from viable male flowers in standard or special pollinizer seeded types to triploid seedless female flowers. Because bees foraging in seedless watermelon plantings carry a mix of viable and non-viable pollen, more pollination visits (16 to 24) by honey bees are needed to set fruit.

First planted watermelons are now flowering in Delaware and Maryland. Honey bees should be placed when the first female flowers appear to achieve good crown sets without defects (i.e. prominent lobes or hollow heart). Placement should be made before 10% of plants are in bloom.

The crown set in watermelon is fruit that set on one of the first 8 nodes of the plant. This is often the most profitable, especially early in the season. Poor crown sets in watermelon can occur when there is poor weather during early

flowering. Honey bee flights are reduced significantly in rain and when winds are 15 mph or greater. Cloudy weather also reduces bee activity. Honey Bees also do not fly much below 55°F, so on cold mornings, as we often have in June, bee activity will not pick up until later in the morning. Unfortunately, female watermelon flowers open early in the morning, are most receptive before 10 am, and then close in the afternoon.

In addition, in early mornings and during poor weather, bees usually visit plants closest to the hives. As the temperature rises or the weather improves, the bees will forage further from the hive. This means that in bad weather watermelons closest to the hives will have the best set and furthest from the hives will have reduced set.

Another problem that causes crown set reduction is the loss of pollinizer plants due to unfavorable weather conditions during or after planting. This means that pollen will be limiting. Research has shown that where pollen is limiting, fruit numbers will be reduced with distance from a pollen source. In fields with limited pollen, expect reduced fruit set or reduced fruit size in areas where pollinizers are missing.

Watermelon growers can manage crops for improved pollination and fruit set with honey bees by:

- Increasing the number of honey bee hives for early watermelon crops. A minimum of one strong hive per acre is recommended in general and 2 hives per acre can be justified for early planted fields.
- Placing hives in several locations in a field rather than just on one edge. While bees will fly over a mile, the best pollination activity is closest to the hives. Hives placed within the field will provide more bee visits to the crop compared to edge placements. Place hives in groups of 4-8 in good locations throughout the field to have even distribution of bees.
- Having ample sources of pollen by planting pollinizers at a minimum ratio of one pollinizer per every 3 seedless plants. Use the most effective pollinizers as shown by local trials. In-

row pollinizers should have limited competitiveness with the seedless melons.

### Bumble Bees

Compared to a honey bee, bumble bees are about 10 times more efficient as a pollinator due to their size, the speed at which they transfer pollen, the efficiency with which they gather pollen within various crops, and their increased endurance to fly in adverse weather for longer periods of time. The bumble bee also has the ability to buzz pollinate the flower for pollen, a pollination technique not seen in honey bees. Buzz pollination occurs by bumble bees vibrating the flower by pumping their wings at a certain frequency, to dislodge pollen. Bumble bee foraging activity starts earlier and ends later in the day than managed honey bees and they forage in lower temperatures. Because of these characteristics, fewer bees are needed to achieve the same crop pollination and commercial colonies only have about 200 bees each (800 per quad).

When assessing bumble bee activity, flag out 10 areas in your field and observe each area on three different days during bloom. These observations should last one minute under sunny, windless conditions, between 9 a.m. and noon. Approach each plot with care so as not to disturb the foraging bees. Stand about three feet from the crop to avoid blocking the flight path of the bees. Count and record the number of bumble bees at each flag, then calculate the average for your observations. You should have an average one bumble bee per ten flags (0.1 bees per flag) to have adequate pollination.

Bumble bee colonies should be shaded and can be placed along shaded field edges. However, if there are other wild flowers nearby, they will also work in those areas, reducing their field effectiveness. Therefore, when placing bumble bees in watermelons or other flowering vegetable or fruit fields needing pollination, it is recommended that bumble bee quads be placed in the field middles under a shade canopy to have more foraging in the target field. Bumble bees should be placed far from honey bee hives to avoid honey bee pollen theft from bumble bee nests.

### Striped Cucumber Beetle and Bacterial Wilt - Jerry Brust, IPM Vegetable Specialist, University of Maryland; [jbrust@umd.edu](mailto:jbrust@umd.edu)

Striped cucumber beetles (*Acalymma vittatum*) (SCB) are the most important insect pests of muskmelon and cucumbers in our area. They overwinter as adults and emerge when temperatures reach 54–62°F at which time they begin searching for cucurbit hosts. Volatiles produced by the plant attracts SCB to cucurbits initially, then male SCBs produce an aggregation pheromone attracting more beetles. The beetles tend to mass on small plants where they eat, mate and defecate (Fig. 1).



Figure 1. Early season feeding of SCB on cucumber

This type of frenzied activity where there are many beetles feeding on a few leaves or a small plant leads to increased chances of bacterial wilt development. The bacterium that causes bacterial wilt in cucurbits, *Erwinia tracheiphila*, is in the cucumber beetle's feces. As the beetles defecate on the leaves where they are feeding the bacteria can be moved into open (feeding) wounds with water that is in the form of precipitation or dew. The more beetles that are feeding and opening wounds on susceptible crops like cucumbers and cantaloupe the greater the chance of bacterial wilt infection. The bacteria multiply and block plant xylem, restricting water flow to the rest of the plant; plants wilt and eventually die (Fig. 2). The wilting usually starts with just one heavily chewed upon leaf wilting and then this wilting progresses to the stem of the leaf and then to major vines of the plant.

This process of vines and the entire plant wilting down can take 2-6 weeks after initial infection, but because the non-infected parts of the plant continue to grow growers might think when they see a plant wilt down that infection took place just within the last few days (Fig. 3).



Figure 2. Cantaloupe plant killed by bacterial wilt infection

One additional problem with SCB and why control sprays may not work as well as they should under some conditions is that the beetles are consistently hiding at the base of the plant (in the plastic hole) where they are feeding on the stem (Fig. 4). Sprayers are set up usually to cover a lot of leaf canopy and often do not do a very good job of putting chemical down in the plant hole. This stem feeding can be severe enough to cause some wilting. It is hard enough to control cucumber beetles with a good cover spray, but when only small amounts of spray are reaching them down in the plastic hole they will not be controlled.

Melon cultivars have different susceptibilities to bacterial wilt infection. Watermelon is almost immune to infection while squash and pumpkin are moderately susceptible. Cantaloupe and cucumbers as well as some of the specialty melon types are much more susceptible. Among the most susceptible cultivars are, Honeydew 252 and HD150 which are honeydew melons; Da Vinci which is a Tuscan type melon and Miracle and Sheba which are a netted yellow-green

melons. Among the most tolerant cantaloupe cultivars are Aphrodite, Athena, Accolade and Astound which are all eastern cantaloupes and just happen to all start with A. The management methods that are recommended for bacterial wilt control for standard cantaloupe varieties (using seed treatments and insecticides when beetles reach 1 per plant or using kaolin clay or row covers before beetles appear) work well. For the specialty melons more attention is needed to carefully follow management recommendations.



Figure 3. Only the leaves at the base of the plant (arrows) were initially infected with *E. tracheiphila* but the whole plant eventually will die



Figure 4. Striped cucumber beetle feeding damage at base of small plants

## Agronomic Crops

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

### Insecticide Update

The following insecticides and seed treatments have been voluntarily removed by the registrants: Meridian 0.20G, Meridian 0.14G, Avicta Complete Corn 500, THX MXM FDL TBZ FS, Adage Deluxe, Adage Premier, Emesto Quantum, V-10170, Inovate Seed Protectant, Inovate Neutral Seed Protectant, Aloft GC, and Flower, Rose&Shrub Care III. More information can be found here:

<https://www.federalregister.gov/documents/2019/05/20/2019-10447/product-cancellation-order-for-certain-pesticide-registrations>.

### Early Season Moth Activity

Trap Location	True Armyworm per night	Black Cutworm per night
Willards, MD	0.1	0.1
Salisbury, MD	0	0.4
Laurel, DE	0	3.3
Seaford, DE	0.4	0.4
Bridgeville, DE	0	---
Harrington, DE	0.1	0.7
Smyrna, DE	0.3	2.3
Kenton, DE	0	0.3
Pearson's Corner, DE	0.1	0
Sudlersville, MD	---	0.7

We have had lower armyworm activity in our blacklights this year compared to last, however you should still look to make sure that you don't have a population that is clipping heads. If you have significant head clipping, worms are active, and smaller than an inch, you may want to consider an insecticide. Pay attention to pre harvest intervals, as most pyrethroids have a 30 day PHI. Mustang has a 14 day PHI, and Prevathon has a 1 day PHI.

**Pythium Causing Damping Off in Corn** - Alyssa Koehler, Extension Field Crops Pathologist; [akoehler@udel.edu](mailto:akoehler@udel.edu)

Over the past week, post-emergent damping off of corn has been present across the state. In most cases, this damping off has been caused by *Pythium* sp. Symptoms can include stunted, slower growing plants, to severely infected, dead plants (Figure 1). Infected plants typically have brown, rotted roots and mesocotyl. In severely infected plants, the top of the plant may be completely separated from the root system, resulting in plant death (Figure 2). Damping off from *Pythium* is common in low field areas that hold more moisture, but wet, cool spring conditions have favored development across entire fields this season.



Figure 1: Damping-off of corn caused by *Pythium*

*Pythium* is a soilborne fungal-like organism that is able to survive in the soil for many years as oospores. Under favorable environmental conditions, the oospores are able to germinate and produce small zoospores that swim in soil water following root exudates to infect emerging seedlings. Once root systems have developed, seedlings can usually survive mild to moderate *Pythium* infections. Seed treatments with

oomycete activity can provide some protection for 10-14 days after planting, and can be helpful for improving seedling emergence and reducing pre-emergent damping off. This year most issues have occurred as post-emergent damping-off. Multiple species of *Pythium* are able to infect corn, with each species having a different optimal temperature. We are currently collecting samples to identify which species have been involved in infection this year.



Lexi Kessler

Figure 2: Corn seedling with damping-off caused by *Pythium*

### Corn Leaf Stages and Growing Degree Days

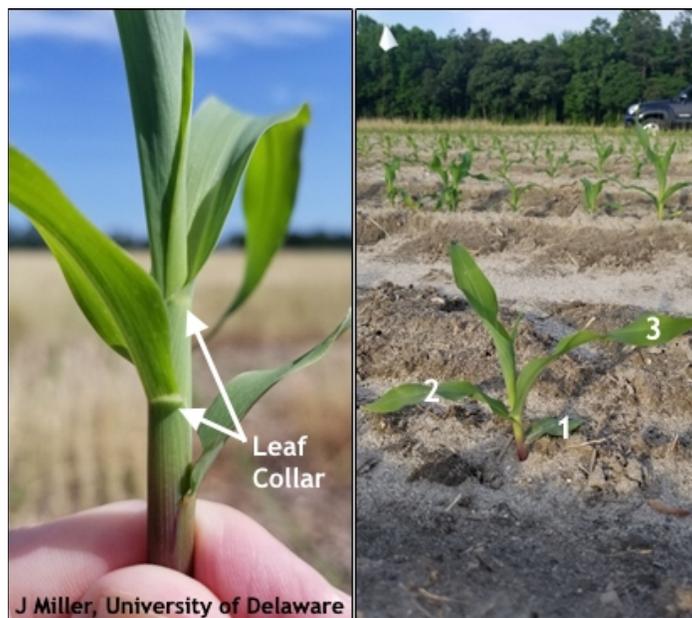
- Jarrod O. Miller, Extension Agronomist, [jarrod@udel.edu](mailto:jarrod@udel.edu)

With the fluctuation in temperatures since mid-April, corn emergence and growth has shifted week to week. At the research station, we have observed corn emergence take up to ten days planted April 24<sup>th</sup>, but only five when it was planted May 8<sup>th</sup>. Rising temperatures accumulate

growing degree days (GDD) in less time, so that would be expected. Looking across the region, any corn planted on May 12<sup>th</sup> should have already emerged in Sussex, or be close to emerging in New Castle (as of May 20<sup>th</sup>).

Following emergence, the next important stage to manage is V6-V8, where you would typically sidedress corn. The V stage means six leaf collars, which can be identified as the white circle around the base of a corn leaf (Figure 1). Emerging, or recently emerging corn leaves will not have a collar yet. In Figure 1, counting the collars puts this field at V3. As you scout fields, some plants may be at the next stage, while the rest will catch up in a day or two.

Statewide temperatures and rainfall since April 1<sup>st</sup> can be seen in Figures 2 and 3. The rapid increase in temperature over the last week should have sped up emergence as well as advancing corn to the next stages. Rainfall over the weekend mostly hit the southern part of the state, increasing totals around Dagsboro and Delmar, but we have seen total rainfall of 6-9 inches since April 1<sup>st</sup> across the state.



J Miller, University of Delaware

Figure 1. Locating leaf collars on corn (left). Counting these collars will get you the corn stage (V3 in this case) to compare to GDD (right).

Table 1. Accumulated growing degree-days based on planting dates through May 20th.

If you planted ↓	Sussex	Kent	New Castle
14-Apr	498	465	441
21-Apr	407	372	354
28-Apr	325	297	274
5-May	225	216	202
12-May	125	118	112

Emergence = 120 GDD, V6 = 475 GDD.

## General

**Guess the Pest! Week 7 & 8** - David Owens, Extension Entomologist, [owensd@udel.edu](mailto:owensd@udel.edu)

There is still time to guess what is going on with corn. Below is another image of field corn being affected by the same cause. This image actually is a two-fer, there is slug injury on the bottom leaves, but slugs do not cause the whorl wilting. This plant will not recover. Less severe injury will show up as the yellowing in last week's images.

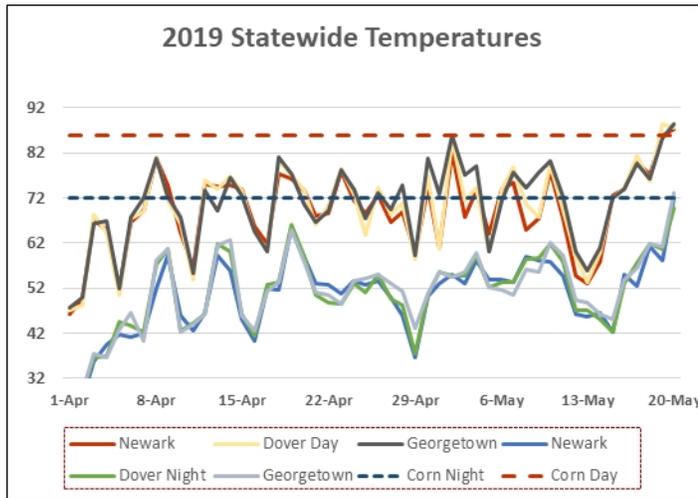


Figure 2. Statewide temperatures since April 1<sup>st</sup>.

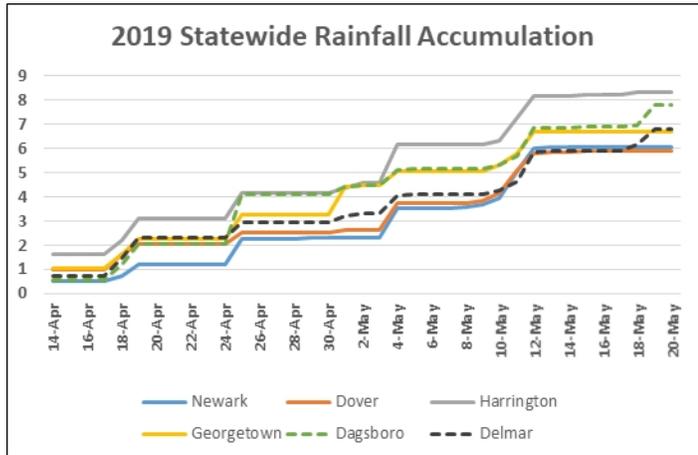


Figure 3. Statewide rainfall accumulation since April 1<sup>st</sup>.

## Announcements

### DSU Blueberry Field Day

Tuesday, June 18, 2019 8:30 a.m. to 2:30 p.m.  
Delaware State University  
Outreach & Research Center  
884 Smyrna-Leipsic Road, Smyrna, DE

#### Speakers

Dr. Dharma Pitchay, Associate Professor, Tennessee State University

A representative from USDA local office, DE

Open to the public. Commercial and Residential Producers are welcome to this FREE Event.

Blueberries can be a profitable, specialty crop that commercial and backyard growers can produce successfully. Participants will be guided through the soil and water testing process as well as discuss production aspects of blueberries. Participants will gain hands-on knowledge of proper planting and pruning techniques to maximize disease prevention and insect control, thus maximizing plant health and productivity.

Interested participants are requested to bring soil sample (1/2 lb) from their plot where they plant blueberries and water sample (30 ml) they apply during irrigation to test pH.

*Class space is limited - registration is required:  
Register by contacting Lekha Paudel, at 302-857-7796  
or email [Lnpaudel@desu.edu](mailto:Lnpaudel@desu.edu).*



To submit your answer, please go to:  
[https://docs.google.com/forms/d/e/1FAIpQLSfUPYLZnTRsol46hXmqgj8fvf5f8-JI0eEUHb3QJaNDLG\\_4kg/viewform](https://docs.google.com/forms/d/e/1FAIpQLSfUPYLZnTRsol46hXmqgj8fvf5f8-JI0eEUHb3QJaNDLG_4kg/viewform)



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### New Castle County's Marl Pit Tailgate Session

Tuesday, June 4, 2019 6:00 – 8:00 p.m.  
UD Cooperative Extension Research Demonstration Area  
¾ Mile east of Armstrong Corner, on Marl Pit Rd. – Road 429, Middletown

#### Bring a tailgate or a lawn chair

Join your fellow producers and the UD Extension team for a discussion of this year's demonstration trials and current production issues. Other topics will include nutrient management, pest management and weed management. This session will inform producers of timely topics observed and occurring in 2019. An

overview of ongoing research in New Castle and state-wide will also be included.

We will wrap up with the traditional ice cream treat.

**Credits:** Nutrient Management (1), Pesticide (1)

*The meeting is free and everyone interested in attending is welcome. Mark your calendar and call (302) 831-2506 to register by Friday, May 24. If you have special needs in accessing this program, please call the office two weeks in advance.*

### **Welcome and Introductions**

6:00-6:05

Dan Severson, University of Delaware Cooperative Extension

### **Overview of Small Grains Variety Trials at Marl Pit**

6:05-6:10

Victor Green, University of Delaware Extension

### **Weed and Cover Crop Update**

6:10-6:30

Mark VanGessel, University of Delaware Cooperative Extension Weed Specialist

### **2019 Insect Pest Outlook**

6:30-6:50

David Owens, University of Delaware Extension Entomologist

*Each year brings different pest management challenges. Issues from 2018 will be reviewed, and stakeholders advised what to be on the lookout for in 2019. Current projects include cover crops, slug management research, *Dectes stem borer*, and prophylactic insecticides.*

### **Nutrient Management Update**

6:50-7:10

Amy Shober, University of Delaware Extension Nutrient Management Specialist

### **Agronomy Update**

7:10-7:30

Jarrod Miller, University of Delaware Extension Agronomy Specialist

*Agronomic updates over the last year include cover crop impacts on cash crop stands, tissue tests for critical nutrients, and some research into planting populations for wheat.*

### **Plant Pathology Update**

7:30-7:50

Alyssa Koehler, University of Delaware Plant Pathologist Specialist

*Discussion will cover common disease symptoms, growth stages most susceptible to disease, fungicide application methods and associated costs, as well as in season scenarios that may affect fungicide decisions.*

### **Conclusion and Evaluations**

7:50-8:00

Dan Severson, University of Delaware Cooperative Extension

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## **Integrated Pest Management Implementation Workshop**

Monday, July 8, 2019

Delaware State University, Smyrna Outreach Research Center

884 Smyrna-Leipsic Road, Smyrna, 19977-3440

### **The workshop will cover:**

- Integrated Pest Management Strategies
- Insect and Mites: life cycles, detection methods, monitoring thresholds and control options
- Experience with predatory mites
- Housing pests and control
- Weed management and cover cropping for specialty crop growers

### **Speakers include;**

Lerman Dion Lewis  
Penn State Center

David Owens  
University of Delaware

Cerruti Hooks  
University of Maryland, College Park

Brian Kunkel  
University of Delaware

**Registration is Open and Free.** To register—please contact Rose Ogutu [rogutu@desu.edu](mailto:rogutu@desu.edu)- Phone number 302-857-6397

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## **Pest and Beneficial Insect Walk**

Wednesday, June 5, 2019 4:00-6:30 pm

Sussex County Extension Office

16483 County Seat Highway

Georgetown, DE

Learn to identify insect and disease pests, as well as beneficial insects in the landscape at the Sussex County Extension Office. Learn about pests on ash trees, and how to differentiate between common and invasive insects such as borers.

Instructors: Nancy Gregory, Brian Kunkel, and Tracy Wootten

**Credits: 2 ISA, 2 Pest., 1 CNP**

**Cost is \$15**

[Register online](#) or call/email Tracy Wootten (302) 856-7303 or [wootten@udel.edu](mailto:wootten@udel.edu).

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### **Establishing a Meadow, the Good, the Bad, and the Beautiful**

Wednesday, June 12, 2019 6:30 p.m.  
Carvel Research & Education Center  
16483 County Seat Highway  
Georgetown, DE

Master Gardeners Sandi Dew and Judy Pfister will present this workshop. Learn about some of the challenges, successes and failures experienced in establishing the new demonstration meadow in our Demonstration Garden. We will tour our Meadow. The evening will end with the movie Five Seasons, The Gardens of Piet Oudolf. Oudolf is a renowned landscape designer, this film highlights his creative process and the resulting gardens.

[Register online](#) or contact Tammy Schirmer, 302-856-7303.

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## **Weather Summary**

Carvel Research and Education Center Georgetown, DE

**Week of May 16 to May 22, 2019**

**Readings Taken from Midnight to Midnight**

### **Rainfall:**

0.04 inch: May 16

### **Air Temperature:**

Highs ranged from 89°F on May 20 to 73°F on May 21.

Lows ranged from 73°F on May 20 to 48°F on May 22

### **Soil Temperature:**

70.1°F average

Additional Delaware weather data is available at [http://www.deos.udel.edu/monthly\\_retrieval.html](http://www.deos.udel.edu/monthly_retrieval.html) and <http://www.rec.udel.edu/TopLevel/Weather.htm>

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

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