WEEKLY CROP UPDATE
UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

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Vegetable Crops

Fruit and Fruiting Disorders in Summer Squash and Cucumbers

– *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

A number of fruit and fruiting disorders have been observed in summer squash and cucumbers over the last two weeks including lack of fruit set, bottlenecking, pinched blossom ends, crooks, nubs, hollow centers or cavities, fruit zippering and scarring.

Lack of fruit set can result from a lack of pollination due to reduced bee activity, reduced pollen viability, or reduced pollen germination in high heat. Water stress will compound this problem. When day temperatures are in the 90s and night temperatures are in the high 70s, plants will commonly abort fruits or produce misshapen fruits. To reduce losses due to heat, apply irrigation so that plants are never under water stress.

Growers should note that some squash (mostly zucchini) varieties will still set fruit without pollination. Steve Reiners at Cornell did a trial in 2013 with 21 varieties of summer squash to determine which were capable of setting fruit without pollination. Female flowers were bagged prior to opening to exclude pollinating insects. After 1 week, bags were removed and fruit rated as to whether it was marketable or not. The results can be found at this web site: http://www.hort.cornell.edu/expo/proceedings/2014/Vine%20crops/Seedless%20squash%20Reiners.pdf. For example Golden Glory and Dunja Zucchini both were able to set a high percentage of fruit without pollination. Selecting varieties with this ability can reduce losses due to poor pollination.

Parthenocarpic varieties of cucumbers and zucchini that set fruit without pollination are also available and can be less susceptible to environmental extremes or conditions that limit bee activity in monoecious or gynoecious varieties. We currently are evaluation 17 parthenocarpic pickle varieties for adaptation to our region.

Lack of fruit set can also be due to harvest management. When summer squash or cucumbers are allowed to progress to an overly mature stage, plants will “shut down” and not reflower for a period of time. To manage this problem, frequent picking (every 2-3 days) is necessary.

Misshapen fruits commonly are found in high numbers with high temperatures and water stress in the summer or low night temperatures in the fall. This includes bottle necking, pinched blossom ends, crooked fruits or fruits with “narrow waists”. These defects are most commonly due to effects on pollination. Other stresses such as herbicide injury, root pruning in cultivation, or wind damage can increase the number of misshapen and unmarketable fruit. Potassium deficiency can also cause pinching at the stem end.

Hollowness or open cavities in cucumber and summer squash fruit can be caused by inadequate pollination and reduced seed set.

Boron deficiency or the combination of boron and calcium deficiency can also result in increased hollowness.

Progression from marketable to unmarketable pickle fruits that are crooked, waist pinched, tip pinched or tip pinched with crook.

Small cavities in cucumber fruit. In a more severe form hollowness and cavities can render the fruits unmarketable or reduce processing (pickling) quality.

High Soluble Salts a Problem in Some High Tunnels

– *Jerry Brust, IPM Vegetable Specialist, University of Maryland*; jbrust@umd.edu

Over the years several high tunnel (HT) growers have complained to me about how after 4-5 years of growing various vegetables (although tomatoes were the most grown) in their high tunnel they are seeing poorer yields and 'unthrifty plants'. This seems puzzling because they have put a great deal of compost in their HT and the soil looks great. The problem I think is high soluble salts in the soil which will damage overall plant fitness and yield. These excess soluble salts often come from fertilizers applied frequently without sufficient water to leach them through the soil. Besides synthetic fertilizers other soil amendments with high salt concentrations include manure and compost. The most common scenario that results from high soluble salt levels in the soil is plant drought stress as soil water is drawn away from plant roots to the high soluble salt regions in the soil. Root cells lose water resulting in wilted foliage and roots that are badly damaged.

However, another scenario that I think is happening a great deal more often in our high tunnels is when plant roots absorb the excess salts in the soil and are unable to metabolize them. The soluble salts enter the roots and are moved through the water conducting tubes to the leaves where the water evapotranspirates, gradually concentrating the salts to toxic levels. The consequence of this type of salt stress in plants is a myriad of problems such as: poor growth, thin canopy, excessive leaf drop, poor fruit set and poor yields with the next damage level up being brown or necrotic leaf edges especially on older leaves that can curl (Fig. 1).

Some of the practices that can exacerbate the salt problem include: allowing the soil to become too dry for even a short time, frequent brief irrigations, short crop rotations, shallow or minimum tillage and little if any soil flooding. Some of our vegetable crops are much more sensitive to high soluble salts than others. Crops such as green beans, onions and peas are most sensitive while cabbage, cucumbers, peppers and potatoes are a little salt tolerant and broccoli, squash and tomato are moderately salt tolerant. These differing sensitivities may be why if tomatoes are grown most often in the HT and then peppers or cucumbers are grown the soluble salt problem can 'suddenly' appear.

Some of the possible in-season remedies for high salts include stopping the use of all fertilizers until salt concentrations return to acceptable levels, having adequate drainage to help move salts out of the root zone and flushing the soil

with as much water as possible for several days (water should be applied slowly so it seeps down into the soil and does not runoff). After the season it may be best to take the plastic off of the HT and allow rain and snow to move the salts out of the growing zone.

Figure 1. Soluble salt damage to peppers in a high tunnel

Potato Late Blight Update #12 – July 10, 2017 – *Nathan Kleczewski, Extension Specialist – Plant Pathology*; nkleczew@udel.edu; @Delmarplantdoc

Late Blight was reported 5/29 near the NC –VA border.

Greenrow – May 1, 2017

Frederica			
Date	**DSV**	**Total DSV**	**P Value**
7/5-7/10	**11**	**60**	**504**
6/23-7/5	**8**	**49**	**467**
6/21-6/23	**3**	**41**	**386**
6/16-6/21	**8**	**38**	**379**
6/8-6/16	**4**	**30**	**354**
6/1-6/8	**4**	**26**	**302**
5/30-6/1	5	22	244
5/25-5/30	3	17	225
5/23-5/25	4	14	179
5/15-5/23	7	10	161
5/4-5/15	3	3	104
5/1-5/4	0	0	30

Notes: Season severity of **18 severity values** indicates the need for the first fungicide application. An accumulated severity of **7 after fungicide application identifies the need for a subsequent fungicide application**. You can personalize your late blight forecasts for specific fields, sign up for email or text alerts, and enter in management information at http://blight.eas.cornell.edu/blight/.

Real time fungicide application timing tables for locations within Delaware can be accessed at http://blight.eas.cornell.edu/blight/DE

See the 2016 Commercial Vegetable Production Recommendations-Delaware for recommended fungicides: http://extension.udel.edu/ag/vegetable-fruit-resources/commercial-vegetable-production-recommendations/

Any suspect samples can be sent to the Plant Diagnostic Clinic or dropped off at your local Extension office. Dr. Nathan Kleczewski can also be contacted at nkleczew@udel.edu or 302-300-6962.

The website USABlight tracks tomato and potato late blight across the nation and can be found here: http://usablight.org/. Information on scouting, symptomology, and management can also be found on this website.

Agronomic Crops

Watch for Two-Spotted Spider Mite in Soybean – *Bill Cissel, Extension Agent – Integrated Pest Management*; bcissel@udel.edu

I am starting to find Two-spotted spider mites (TSM) in soybeans. Populations are still **low** and hopefully, by the time this article goes to print, we will have received some rain that can encourage TSM populations to crash. Hot, dry weather favors TSM and drought can trigger outbreaks. TSM populations are held in balance by natural enemies and the weather. Under high temperatures, the amount of time required for TSM to complete its lifecycle is shortened, allowing more generations to be completed in a shorter period of time. Female TSM can produce 300 offspring in her lifetime (~30 days) and most of the individuals in the population are female. Dry conditions also diminish the activity of fungal diseases that often play a key role in keeping outbreaks from occurring. *So if it rains, does it mean we don't need to worry about TSM?*

Precipitation can not only favor spore formation and mite infection but also reduces plant stress. This however isn't always a silver bullet and TSM populations can continue to increase even after rain events, especially if the weather returns to being hot and dry. Cool nights and humid conditions promote the fungal disease that infects TSM.

Scout for TSM by examining the underside of 5 leaflets in 10 locations for mites, noting the presence of mite eggs and the amount of leaf damage. The threshold for TSM during bloom to podfill is 20-30 mites per leaflet and 10% of plants with 1/3 or more leaf area damaged.

Concentrate scouting efforts on field edges for initial detection, especially edges bordered by grass and road ditches (it's not unusual to also find hot spots in the interior portions of the field). TSM typically develop on grasses and other plants on field borders before ballooning into fields. Once TSM are detected, scout the interior portions of the field to determine if they have spread throughout the entire field. If only concentrated on field edges, spot treating may be an option. If spot treating on field edges, extend the treated area about 100 ft further into the field from the damaged area.

Here is a link to our Soybean Insecticide Recommendations for chemical control options: https://cdn.extension.udel.edu/wp-content/uploads/2012/05/18063934/Insect-Control-in-Soybeans-2017-final.pdf

Also note that in 2016, two miticides were registered for use on soybeans; Zeal SC, (Valent U.S.A Corporation) and Agri-Mek SC, (Syngenta Crop Protection, LLC). These are the only labeled formulations of these products. Please consult the label for rates, additional restrictions, and adjuvant requirements.

Zeal SC Supplemental Label for use on soybean: http://www.cdms.net/ldat/ldCCK003.pdf

Agri-Mek SC Label: http://www.cdms.net/ldat/ld9NL020.pdf

Foliar Fungicides for Corn – Yes or No? -

Nathan Kleczewski, Extension Specialist – Plant Pathology; nkleczew@udel.edu; @Delmarplantdoc

We are entering that time of year when growers start to think about fungicides for corn. Depending on who you speak to you will hear that they range from being 100% necessary to 100% unneeded. In reality, it's likely somewhere in between. Before I get too far into what to consider, let's go over how foliar diseases can impact a corn plant.

Foliar pathogens of corn tend to fall into two groups. One group produces toxins that kill plant tissues and the pathogen feeds off of these decaying or dead tissues to grow and reproduce. An example of such a disease is Gray leaf spot. The second group of foliar pathogens produce "straws" that allow the pathogen to siphon nutrients from living host tissues. These pathogens need the plant to be alive in order to grow and survive. Examples of this type of pathogen include the rusts.

When either type of pathogen affects the plant, particularly the ear leaf after tasseling, it uses carbohydrates that the plant needs for filling the ear. The ear leaf and leaf below provide the majority of carbohydrates for ear fill, and this is why they are the most important tissues to protect and focus on. When carbohydrates are limited, the plant can start to draw nutrients from its reserves in the roots and stalk to support ear fill. Consequently, the roots and stalk may not have sufficient nutrients and energy to survive, and these tissues may weaken. The end result is typically reduced yields, and potentially greater chance of lodging later in the season. In sum: if the ear leaf is significantly impacted by foliar disease before black layer, there is **a chance** you may see yield loss and standability issues later in the season. Remember- I am saying that there is a chance. **I am not saying it is a certainty.**

Gray leaf spot.

Northern corn leaf blight.

That being said, foliar fungicides will benefit you and your operation if you are at high risk for commonly occurring foliar diseases. What are the most commonly occurring diseases that you will see in Delaware and Maryland? 1) Gray leaf spot and; 2) Northern corn leaf blight. These are residue-borne diseases that need persistent, wet conditions to infect foliage. Diseases such as common and southern rust can occur very sporadically, typically not until very late in the season, and are not considered significant, yield-limiting diseases in this region.

Now that you know what diseases may impact your corn, how do you go about determining the likelihood that a foliar fungicide can help you? Paul Vincelli, from the University of Kentucky likes to use the idea of a risk ladder. The higher up you are on the ladder, the greater your risk of falling to disease-related problems, and the more likely you will see a benefit from a fungicide application. What are the ways to move up the risk ladder? Here is my list of the major factors influencing foliar fungicide effectiveness, in order of importance.

The higher up you are on the corn disease ladder the greater the risk you are for falling to disease related issues.

1) **Hybrid resistance to commonly occurring foliar diseases.** Is your hybrid rated good to excellent for Gray leaf spot or Northern corn leaf blight? If yes, then the risk of developing these diseases, regardless of other conditions, is greatly reduced. If your hybrid is rated poor to fair for these diseases, then, if the conditions favoring disease occur, a fungicide application could be beneficial.

2) **Residue and rotation.** Are you planting into ground that was in corn last season? Are you planting no-till? Increased amounts of corn residue provides more material for the Gray leaf spot and Northern corn leaf blight pathogens to

overwinter, grow, and potentially infect your corn under the right conditions. If you rotate to soybean or other crops such as vegetables, or till your ground, the amount of these pathogens available to infect your field is greatly reduced.

3) **Irrigation.** Are you heavily irrigating your corn? The longer the amount of leaf wetness, the greater opportunity for foliar diseases to infect the plant. Dryland corn only receives water with rain and therefore, risk is related to weather patterns.

4) **Standability of your corn.** Did you purchase a hybrid with good to excellent stay green or standability ratings? If yes, then the potential for late season lodging, even if facilitated by foliar disease, is greatly reduced.

After going over these factors, where are you on the ladder? If you are high up and at risk of falling, then what can we say about the foliar fungicides? First- when should the fungicide be applied and how many applications are needed? For a fungicide application to be the most effective, applications should occur between VT and R1. If disease is not present at this time the application can be delayed as far as R3. Research on multiple fungicide applications has indicated that growers will see the greatest return for their investment by applying a single fungicide application at this timing. Unless you are growing for the yield contest, multiple applications are not required and are not likely to be economically beneficial.

In addition, there are many products to choose from. For an unbiased rating of the most commonly used foliar fungicides for corn click here. I'm not going to discuss which products are the best, rates, etc. However, I will say that you should be certain that you are seeing a return on your applications. Are you being told that a new product is, "the best"? Are you hearing the word, "guarantee"? Prove it to yourself. After all, it's your field, right? How can you do this? Leave an untreated section or strip of the field to allow yourself to compare yields and standability at the end of the year. Ensure that the section can be harvested and that it is representative of the field. Do not use field edges. By doing this you will have an idea of if the application had an impact in that field. Simply comparing fields is not appropriate. Why is this? Because each field will differ in conditions that will impact disease and yield. As such, any differences you see are confounded with a multitude of other factors that may impact yield. Untreated areas or strips can be related to a specific field and therefore allow you to make more informed decisions pertaining to treatment effectiveness.

Remember- foliar fungicides are a helpful tool for producing corn, but are not always required. Look at your risk ladder and if you decide you want to make an application, save yourself some guesswork and leave an untreated area of the field to assess later in the season. They say a picture is worth a thousand words, right? The same can be said for conducting a simple, on farm trial.

General

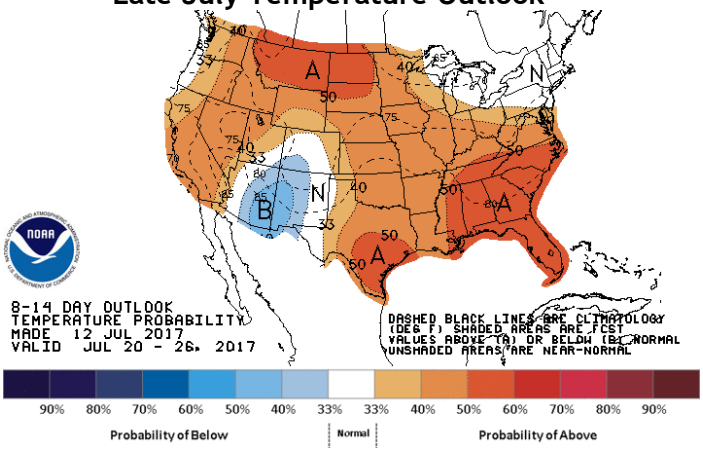
Delaware July – August Agriculture Weather Report - *Scott A. Minnick, NOAA-National Weather Service, Wakefield, VA*; scott.minnick@noaa.gov, www.weather.gov

Following a warm and dry June, widespread rainfall from July 4-6 has helped get July off to a relatively wet start. However, warm conditions continued with temperatures averaging 3 to 4 degrees above normal through July 12. Medium range guidance indicates the June trend returns through the end of July, with overall warm and dry conditions expected. The Climate Prediction Center agrees with outlooks for increased probabilities for above normal temperatures. The outlook for precipitation is always challenging this time of year due to the scattered nature of summertime convective. The Climate Prediction Center predicts a dry trend through the next 6-10 days, but we begin to see indications for increased probabilities for above normal rainfall to end the month.

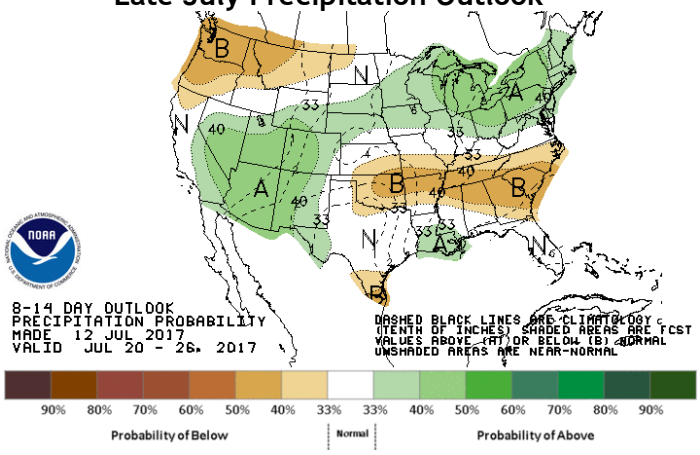
Looking ahead to August, there is no indication the warm trend will let up. There remains a great deal of uncertainty in the precipitation outlook, as there is typically a dip in precipitation in late summer. The Climate Prediction center has resorted to equal chances for above, below, or near-normal rainfall. That outlook could always change with a potential tropical system in August as we move closer to

the peak of the season. Average high temperatures across the state for August remain in the mid-80s. Overnight lows are generally in the mid-60s. Rainfall for the month is around 3 to 4 inches.

Late July Temperature Outlook

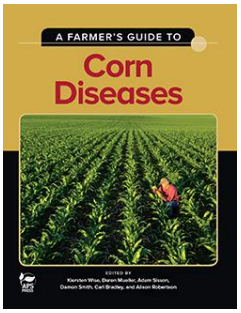


Late July Precipitation Outlook



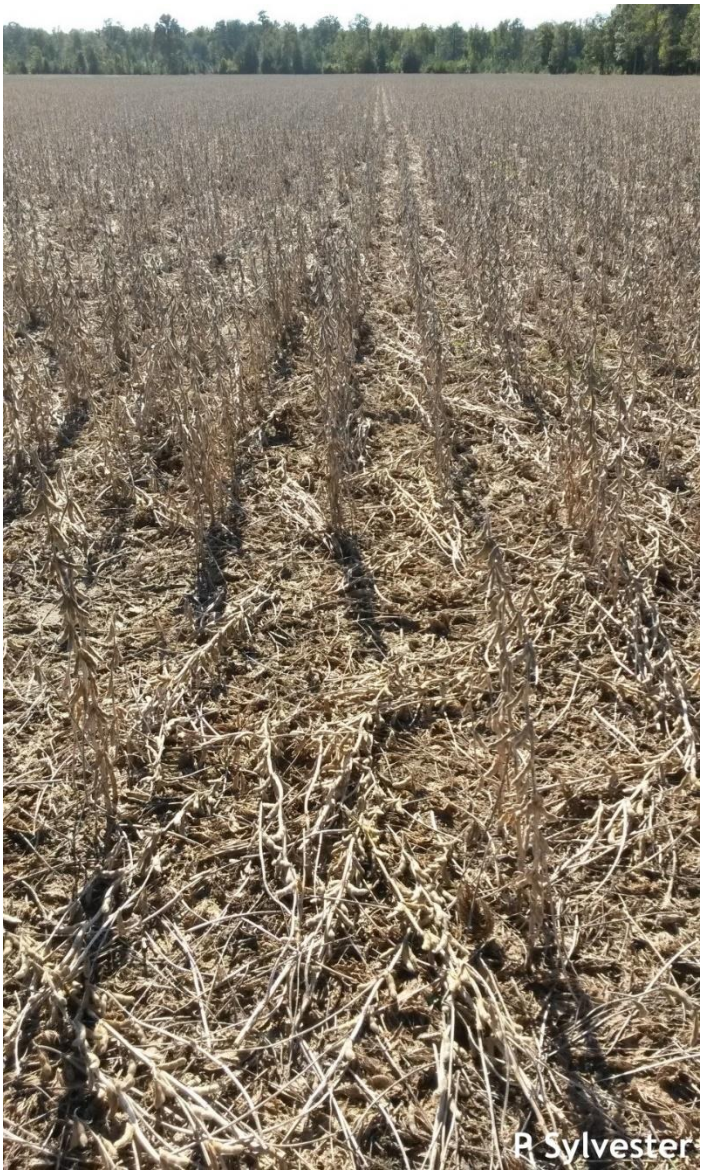
Guess the Pest! – *Bill Cissel, Extension Agent – Integrated Pest Management*; bcissel@udel.edu

This past week's Guess the Pest was a little challenging and only one person got the answer correct. Here are a few more "clues" to help in identifying the pest. If you submitted an answer last week and want to change your answer, please feel free to do so. Guessing correctly will automatically enter you into a raffle for $100 gift card at the end of the season. One lucky winner will also be selected to have their name entered into the raffle not once but five times and will receive a FREE copy of A Farmer's Guide to Corn Diseases. Click on the Guess the Pest logo below to participate in this week's Guess the Pest! For Guess the Pest # 14/15, we will also be giving away A Farmer's Guide To Corn Diseases ($29.95 value) to one lucky participant.



http://www.plantmanagementnetwork.org/book/cornfarmersguide/

Guess the Pest Week #14 (updated with additional photos)



What insect caused this damage?

To submit your guess click the Guess the Pest logo below or go to: https://docs.google.com/forms/d/e/1FAIpQLSfUPYLZnTRsol46hXmgqj8fvt5f8-JI0eEUHb3QJaNDLG_4kg/viewform?c=0&w=1

Announcements

2017 Dickeya and Pectobacterium Summit

November 9, 2017

University of Maine staff are working to address Dickeya, a recent and potentially "devastating bacterial disease in Maine seed potatoes." Projects are being conducted in Maine and in collaboration with colleagues in other states. We have been successful in pursuing funding opportunities and hope to have news soon on additional pending grants.

Some of the efforts include:

- Chemical control of Enterobacteria
- Identifying seed lots with Enterobacteria
- Enterobacteria spread and epidemiological studies
- Enterobacteria identification
- Enterobacteria pathogenicity
- Enterobacteria levels in a seed lots related to stand

loss
• Movement of Enterobacteria in a seed system
• Postharvest test for the presence of • Enterobacteria

Results from these studies will be presented at the 2017 Dickeya and Pectobacterium Summit November 9, 2017. The summit will be your chance to hear about improvements in the dormant tuber post-harvest test, among other topics.

For interest, please see a bulletin #482 entitled: "Factors Affecting Potato Blackleg and Seed Piece Decay."

The Introduction has this sentence:

"State potato seed certification officials discriminate against the presence of blackleg and many buyers refuse to purchase seed stocks known to have even a small percentage of the disease."

By the way, the bulletin was from 67 years ago, May 1950.

To register for this meeting and for additional information go to: https://extension.umaine.edu/agriculture/programs/dickeya-and-pectobacterium-summit/

Cover Crops, Soil Health and On Farm Research

Thursday, August 10

Two Educational Programs are scheduled for August 10. In the morning there will be program on cover crops and soil health sponsored by the Sussex County Conservation District with University of Delaware and Delaware State University. In the afternoon, there will be a session on conducting on-farm research. More details will be provide in future newsletters, but this early notice is provided so you can mark your calendars.

Whole Farm Revenue Protection (WFRP) Workshop

Tuesday, August 22, 2017 9:00 a.m.-12:00 noon
University of Delaware
Carvel Research & Education Center
16483 County Seat Highway, Georgetown, DE

An emerging insurance product, Whole Farm Revenue Protection (WRFP), is now available throughout the U.S. In many cases, **WFRP can provide more actual income protection at a reduced premium cost**.

This workshop will include an introduction to WFRP. Every farm family should have someone in attendance to get an overview of how the Whole Farm coverage concept works.

Details are still being arranged. Save the date and watch future Weekly Crop Updates for further details. In the meantime, contact Laurie Wolinski at 302-831-258 or LGW@udel.edu.

Cut Flower Tour on the Eastern Shore

Tuesday, September 12, 2017

Save the Date! Details coming later this summer.

Organized by University of Maryland

2017 UD/DNLA Summer Hort Expo

Tuesday, August 15
University of Delaware Botanic Gardens
Newark, Delaware

UD/DNLA's 2017 Summer Turf & Nursery Expo will be held Tuesday, August 15, 2017 at the University of Delaware Botanic Gardens Newark, Delaware.

For more information or to register - http://www.dnlaonline.org or contact Valann Budischak at (888) 448-1203 or info@DNLAonline.org

The Delaware Nursery & Landscape Association (DNLA) is a non-profit association of green industry professionals.

Disease and Insect Identification Workshop

Wednesday, July 19, 4-6 pm
University of Delaware
Room 012 Townsend Hall
531 South College Avenue, Newark, DE

Learn what signs and symptoms the Extension Specialists use to identify pests and diseases! Tips and techniques will be shared. Fresh and preserved specimens will be available to look at using hand lenses and microscopes.

Instructors: Nancy Gregory and Brian Kunkel

Credits: 2 pest., 2 ISA, and 1 CNP

Cost: $15

Register with Carrie Murphy (302) 831-2506 or cjmurphy@udel.edu

Laurel Auction Market Tour

Wednesday, August 2, 2017 8:30 a.m.
10667 Georgetown Road
Laurel, DE 19956

A morning visit to the Laurel Auction Market in Laurel, DE to learn more about the process of selling through the market. Please join us at 8:30 a.m. at 10667 Georgetown Road, Laurel, DE for a tour of the market, to learn how sales take place, see baskets and other items for sale at the market to the public.

If you are interested in join us for this tour, contact Tammy Schirmer, tammys@udel.edu or 302-856-7303.

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of July 6 to July 12, 2017

Readings Taken from Midnight to Midnight

Rainfall:

0.57 inch: July 6

Air Temperature:

Highs ranged from 94°F on July 12 to 81˚F on July 6.

Lows ranged from 76˚F on July 12 to 63˚F on July 10.

Soil Temperature:

80.9˚F average

Additional Delaware weather data is available at http://deos.udel.edu/

Weekly Crop Update is compiled and edited by Emmalea Ernest, Associate Scientist – Vegetable Crops with assistance from Don Seifrit.