WEEKLY CROP UPDATE
UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

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Vegetable Crops

Vegetable Crop Insect Scouting – *David Owens, Extension Entomologist,* owensd@udel.edu

Cucurbits

Watermelons are fairly quiet right now. Continue scouting for spider mites. Recent hot dry weather will stimulate mite reproduction, and we are seeing some increase, though not at threshold level, in fields treated earlier this year. Also be sure to note the presence of any caterpillars that could feed on developing fruit rinds. Cucumber beetle may begin coming out of the soil again this week coming.

Legumes

Be on the lookout for potato leafhopper, especially on young plants. Thresholds are 5 per sweep. Also be scouting for tarnished plant bug and stink bug. The threshold for TPB is 15 per 50 sweeps while for stink bugs it is 7 per 50 sweeps. We have had quite a bit of stink bug movement in our blacklights, and tarnished plant bug has been active this season.

Sweet Corn

Moth pressure continues declining statewide. Monday and Thursday trap 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: https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/pest-management/insect-trapping/silk-stage-sweet-corn/. Thursday's trap capture is as follows:

Trap Location	BLT - CEW	Pheromone CEW
	3 nights total catch	
Dover	0	34
Harrington	0	51
Milford	0	24
Rising Sun	0	58
Wyoming	0	5
Bridgeville	1	17
Concord	1	48
Georgetown	0	5
Greenwood	1	
Laurel	1	27
Seaford	0	12
Lewes	0	3
Harbeson		0

Problems with Pollination in High Tunnel Tomatoes – *Jerry Brust, IPM Vegetable Specialist, University of Maryland*; jbrust@umd.edu

Over the last month I have received reports from high tunnel (HT) growers that were seeing flower abscission due to poor pollination in their tomatoes (Fig. 1). Some of these reports were a few weeks ago and others were just this past week. There are unfortunately several factors that can cause poor pollination in tomatoes.

Figure 1. Complete flower loss on tomato cluster

I'll start with a quick recap as to how tomato flowers are pollinated and fertilized. Tomatoes are self-pollinated at the rate of around 96% of the time. Tomato flowers are complete flowers that have both male (stamen) and female (pistil) parts within the same flower. The yellow anthers (produce pollen) of the stamen wrap around the pistil which is in the center of the flower. The style with the stigma on its end is the part of the pistil that extends above the anthers. Tomato pollen is heavy and sticky and needs to be jostled loose from the male to fall onto the female. This 'jostling' can include wind or insect visits. Once pollen is shed onto the stigma of the flower fertilization can take place. Without pollination the pedicle turns yellow, the flower dies and then drops. Tomato flowers must be pollinated within 50 hours of forming or they will abort. Pollination usually occurs between 10 a.m. and 4 p.m.

One of the most important factors affecting pollination is temperature. Tomato plants will drop their flowers when daytime temperatures are above 88-90 °F or when nighttime temperatures are above 70 °F. These temperatures occurred in our HTs these last few weeks. However, in the early part of the season low nighttime temperatures below 55 °F can interfere with the growth of pollen tubes or cause the pollen to become sterile, preventing normal fertilization and causing flower drop. Fruit will not set until nighttime temperatures are above 55 °F for at least two consecutive nights.

Besides temperature the other big problem causing poor pollination in high tunnels is poor flower vibration or 'jostling'. Because tomatoes are in high tunnels they may not always be exposed to winds that will help 'jostle' the tomato flower, which releases pollen. Some other mechanism is needed at times to vibrate tomato flowers to increase pollination. The final size and weight of fruit is largely determined by the number of seeds set, which is ultimately due to the quality of pollination and fertilization. A HT tomato plant should produce between 20-30 lbs of fruit/plant, if it is not then poor pollination may be the cause. My HTs produced around 18 lbs/plant and I conducted some trials to try and increase my pollination success using an air-blower that was passed over the plants every few days for just a few seconds after they started forming flowers. My per plant yields went from 18 lbs to 28 lbs and I was able to increase my marketable yield by 35-50% just by increasing pollination and fertilization in my tomato plants.

You do not have to use an air-blower to achieve better pollination and fruit set, most growers use bumblebees, which use sonication or buzz pollination. The bees will fly up to a flower and grasp the anthers with their mouth parts and hold tightly. They then vibrate their wing muscles which causes pollen to drop from the anthers onto the stigma causing pollination and at the same time the bumblebee gets to collect some of the pollen (Fig. 2). This grasping of the tomato flower by the bee leaves a mark on the flower (Fig. 3) and can be used by growers to see if bumble bees are visiting their tomato flowers. Studies have shown that just 1-2 visits by bumblebees to tomato flowers will result in greater than 80% fruit set vs no visits which result in approximately 30% fruit set.

The bottom line is that tomato pollination is a delicate balance between the correct temperatures and having enough flower vibration to ensure good pollen drop. If you are getting only 15-16 lbs/plant or less in your HT tomatoes you may want to examine how well your plants are being pollinated and just what your fruit set is like.

Figure 2. Bumblebee visiting tomato flower results in pollination.


Figure 3. Top flower not visited by bumblebees; bottom flower was a few times.

Heat Stress Trial with Tomato– *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

A trial was conducted in 2019 at the University of Delaware Thurman Adams Research Farm, Georgetown, Delaware to evaluate 28 commercial and experimental tomato cultivars for yield and quality under heat stress. Plants were transplanted to the field on 31 May 2019. Field plots were one row (6') wide and 10' long. The experiment design was a RCB with four replications. In-row spacing for plants was 1.5' with 6 plants per plot. Fruit were harvested five times: 8 August, 20 August, 4 Sept., 16 Sept., and 28 Sept. Fruits were graded into Extra Large (XL), Large (L), Medium (M), Small (S) sizes, Seconds (2nd) and Culls. Five large tomatoes in each plot were cut and evaluated for the appearance of white tissue. On the second harvest, tomatoes were also given a white tissue rating (0-10) and tested for soluble solids.

The top group in terms of marketable yield were Grand Marshall, XTM 2256, Red Snapper, STM 2255, Red Mountain, Red Bounty, and FTM 6281 and ranged from 19.6 to 15.5 lbs./plant. Most varieties had peak yield on harvest 2. Varieties that had peak yields on the first harvest were Red Mountain and FTM 6163. Varieties with peak yields on harvest 3 were Red Snapper, FTM 6281, Jamestown, Myrtle, and Saybrook. Varieties showing extended harvest (over 4 lbs./plant in harvests 4 +5) were Grand Marshall and XTM 2256. Grand Marshall and XTM 2256 had significantly higher numbers of tomatoes per plant compared to all varieties except Mountain Fresh, STM 2255, and Jamestown. Grand Marshall and XTM 2255 also had much higher numbers in harvests 4 and 5 than other varieties.

Varieties with low mean incidence of white tissue (less than 1.5) were Jamestown, FTM 6298, Primo Red, and Red Bounty. Varieties with incidence of white tissue over 3 were Camaro, FTM 6163, Mountain Merit, and Mountain Fresh. Varieties with all tomatoes sampled showing white tissue on harvest 1 were FTM 6163, Camaro, and Red Snapper. All samples of Mountain Fresh and FTM 6163 had white tissue in harvest 2. White tissue incidence decreased as temperatures decrease across all varieties; however, Grand 5 Marshall, Mountain Merit, and Myrtle had more than 2.5 tomatoes showing white tissue in harvest date 4 and Mountain Fresh was still showing 40% white tissue in harvest date 5.

XTM 2256, FTM 6281, Bella Rosa, and FTM 8011 had soluble solids 4.5 or greater. Camaro, Red Snapper, FTM 5187 Dixie Red, BHN 602, Mountain Fresh, Saybrook, Mountain Merit, Red Deuce, and FTM 6163 had white tissue severity ratings of 4 or greater. This corresponds to white tissue covering 40% or greater of the fruit. Camaro had a white tissue severity rating of 8.3. STM 2255, Roadster, and FTM 8011 had white tissue ratings under 2.

FTM 6281 had over 4 lbs./plant in the XL category. Red Snapper, Grand Marshall, Red Bounty, XTM 2256, SV 7101, STM 2255, FTM 6281, Red Mountain, and FTM 6298 yielded over 5 lbs./plant of Large tomatoes. Red Mountain, Grand Marshall, XTM 2256, and Red Snapper had over 5 lbs./plant of medium tomatoes. Red Mountain had 3.4 lbs./plant of Small tomatoes. Seconds which comprised mostly of tomatoes with some cracking were 2.8 lbs./plant in Primo Red. Varieties with over 2 lbs./plant in the Cull (misshapen) category were Biltmore, Red Deuce, Camaro, Roadster, and Mountain Merit. Mountain Majesty, Camaro, and Red Deuce had 7 or more fruits per plant in the cull category. Varieties with less than 5 % culls were Grand Marshall, Jamestown, and Mountain Fresh.

This trial is being repeated in 2020.

Some of the Varieties From the 2019 Tomato Trial

Fruit Crops

SWD Found in Blueberries and Cherries in Maryland – *Jerry Brust, IPM Vegetable Specialist, University of Maryland*; jbrust@umd.edu

A few blueberry and cherry growers in central Maryland have reported fruit damage to their crop from Spotted Wing Drosophila (SWD) this week. If you grow any small fruit such as blueberries, cherries, blackberries, raspberries it would be best if you check these crops for the presence of SWD. This is earlier than we usually see damage from this pest, but it is not totally unexpected. In New York over the years they have been finding SWD earlier and earlier in their traps throughout the state, with many locations recovering SWD throughout June. If you have had problems in the past with SWD and you are not using traps to monitor them and your blueberries are turning from green to purple you should probably think about going on a spray program if you have not already.

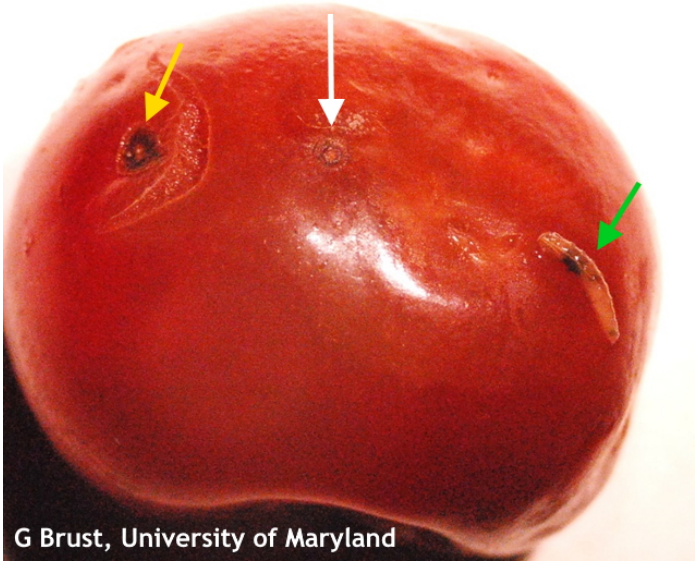

Figure 1. Cherry fruit with SWD oviposition sting (white arrow), exit hole of maggot (yellow arrow) and the maggot (green arrow).

The damage starts with the female fly cutting a slit into ripening fruit with her serrated ovipositor, this later looks like a "sting" in the berry (Fig. 1). Maggots will then feed by tearing and shredding the interior of the fruit often causing a softened collapsed brown area (Fig. 2). When ready to pupate the maggot will exit the fruit causing an exit hole (Fig. 1), which can allow entry of microorganisms that cause rot. Fruit should be examined very carefully for any of these signs of SWD presence. Be sure to rotate between materials of different chemical classes to slow the development of pesticide resistance.

Figure 2. Brown collapsed area on cherry fruit due to SWD maggot feeding.

Agronomic Crops

Agronomic Crop Insect Scouting – *David Owens, Extension Entomologist,* owensd@udel.edu

Alfalfa

Continue sampling for potato leafhopper. They can be easily found in soybean and snap bean and any alfalfa that does not have the glandular trichomes and is considered susceptible is at risk. Do not wait until you see hopperburn before deciding what to do about the hoppers. Also be sure to note blister beetles. Do not handle them if you see them in your net, the will break joints to expel a droplet of blood containing cantharidin which causes skin blisters. Horses are especially sensitive to canthardin and can become very sick from it. This year I have seen more blister beetle activity in weeds and other crops.

Field Corn
Japanese beetles are active and are a somewhat minor defoliator. Although eye-catchy, most beetle leaf feeding is minor and highly localized to specific parts of field edges. There are no defoliation thresholds. Some of the earliest corn is silking now, beetle thresholds are silks clipped back to less than ½ inch, less than half the plants have been pollinated, and beetles are present. Continue also looking for stink bug in corn. We are entering the growth stages that recently had threshold revisions.

Sorghum
Fall armyworm may start arriving in our area soon, and this worm can get into the whorls. Thresholds for whorl stage infestations is 75% of infested whorls. I mention this because grasshoppers have been showing up in some fields. The threshold for grasshopper is also fairly high. Available guidance from Georgia and Kansas fact sheets use 5-8 nymphs in field interiors as a threshold.

Soybean
Spider mites are present in numerous fields, especially around field edges that received some herbicide. The herbicide will drive mites out of the weeds, similar to mowing. Other insect pests that are common right now include Japanese beetle, thrips, green cloverworm, bean leafroller, grasshopper and blister beetles. Typically, pre-flowering defoliation thresholds are set at 30-40%, however, with the dry weather pattern we are in, it may be harder for the plants to compensate for feeding injury and thresholds are a tick lower. Bean leafroller seems to more common this year than in years past. Large numbers of grasshoppers can be found in some fields, particularly following a small grain cover or double cropped into wheat or barley. Pay close attention to defoliation in fields with grasshoppers in them. Stink bugs are also beginning to move into flowering fields. Stink bugs will not cause damage to beans prior to R3 – pod development.

Corn Diseases Update – *Alyssa Koehler, Extension Field Crops Pathologist*; akoehler@udel.edu

As tasseling in corn approaches, now is a good time to scout fields to decide if a fungicide will be applied. When considering the economics of a fungicide application, it is important to know your potential for disease based on field history, environmental conditions, and hybrid selection. Many of the foliar pathogens of corn can survive in residue, so corn-on-corn fields carry a higher potential for disease, especially if disease has been observed in previous years. Hybrids with higher resistance ratings may not need a fungicide. Resistant hybrids typically have smaller lesions and reduced spread of spores. In dryland fields, hot, dry weather will keep disease pressure low. Reports of foliar diseases have been minimal so far this season. Irrigated fields keep enough moisture to favor environments for disease and may see development of Grey Leaf Spot (GLS) or possibly Northern Corn Leaf Blight (NCLB). GLS is one of our most common diseases of corn and usually begins on lower leaves as small, tan, rectangular lesions with a yellow halo. When lesions are young, they can be difficult to distinguish from other common corn foliar diseases. As lesions mature, they become more diagnostic. At maturity, lesions are grey to tan in color, with a long rectangular shape (Figure 1); partially resistant hybrids can have more jagged margins than lesions on susceptible cultivars. Lesions often join to form large necrotic areas under favorable environmental conditions. Yield reductions are typically observed when lesions are present on the two leaves below the ear leaf or higher, so these are the leaves to pay close attention to when scouting. If over 50% of plants have lesions on 5% or more of this leaf surface, you may want to consider a fungicide application. If applying a fungicide, VT/R1 timing has shown the greatest chance of economic return.

Figure 1. Rectangular lesions of Grey Leaf Spot on corn

Auxin Herbicides Plus Glyphosate Can Reduce Grass Control

– *Mark VanGessel, Extension Weed Specialist*; mjv@udel.edu

Antagonism between herbicides occurs when more than one herbicide is included in the spray tank and one herbicide reduces the effectiveness of another herbicide. This is not something new, we have been dealing with this issue for a long time. There have been reports of 2,4-D and dicamba interfering with the grass control from glyphosate. Today, rating one of my studies, I observed this occurring. Glyphosate applied with dicamba or tankmixed with fomesafen at a rate of 1.5 pts/A did not control fall panicum as well as glyphosate by itself. However, I did not see any antagonism with glyphosate plus fomesafen at 1 pt/A (low rate). I have had over 20 trials with Xtend soybeans over the past three years and this is the first time I have observed this. So, while there is a potential for antagonisms to occur, environment and other factors also determine if antagonism will occur. And it is not something that will occur every time an auxin herbicide and glyphosate are tankmixed together.

The only way to ensure antagonism does not occur is to apply these herbicides separately; which is not practical in most situations. To reduce the likelihood of antagonism, apply when weeds are actively growing, before weeds get too large, use proper rate of glyphosate, and use the appropriate recommended adjuvants. Antagonism can also occur if auxin herbicides are tankmixed with ACC-ase herbicides such as Select or Poast. So, I am not sure if including an ACC-ase herbicide is a viable option to overcome the auxin and glyphosate antagonism. There are a number of programs around the country are researching this topic, so I hope to have better recommendations for next season.

Photo 1. Glyphosate plus dicamba applied at V-2 stage

Photo 2. Glyphosate plus low rate of fomesafen

Maryland/Delaware Forage Directory – *Jarrod O. Miller, Extension Agronomist,* jarrod@udel.edu and *Dan Severson, New Castle Co. Ag Agent*; severson@udel.edu

To assist in the hay and forage market, the Maryland Delaware Forage Council (MDFC) has setup an online forage directory for buyers and sellers of hay (https://www.foragecouncil.com/hay). This directory is available to the public to browse, but hay producers must be a member of the MDFC to post hay for sale.

The directory is separated by the Delmarva, Central, and Western Maryland regions to help those in search of hay. Any forage producer may list their hay by type (grass/legume/mixed) or bale size (large/square/other) and include any other information they would like the public to know.

If you would like to post hay for sale on the MDFC page (https://www.foragecouncil.com/), membership can be done by mail or online and is only $25 per year for individual or business memberships.

General

Insecticide Update: Sivanto HL – *David Owens, Extension Entomologist,* owensd@udel.edu

Early this year, Bayer released Sivanto HL, a higher concentration version of Sivanto Prime. It is a good aphid, whitefly, leafhopper, and some sucking bugs product, mode of action group 4D. It is also much softer on bees than most other group 4 insecticides. It is translaminar, and will translocate from application site to growing points. It is suggested to use a spreader/penetrant type adjuvant.

Guess the Pest! Weeks 12 & 13 Answers: Pythium Root Rot and Japanese Beetle – *David Owens, Extension Entomologist,* owensd@udel.edu

Congratulations to Chris Cawley and Buzz Lowe for correctly identifying the corn photos as Pythium and Japanese Beetle!

Japanese beetle feeding on corn.

For a brief discussion of Japanese beetle, see the field corn section in this weeks' agronomic insect scouting report.

Pythium root rot on field corn.

Regarding Pythium, this from Dr. Alyssa Koehler:

"Symptoms of Pythium root rot include stunted, slower growing plants, to severely infected, dead plants. Although we have not had excessive rainfall, Pythium has been fairly prevalent across the region this season. Emerging seedlings are at the highest risk for severe symptoms and damping off. As root systems continue to develop, plants can usually survive mild to moderate *Pythium* infections."

Guess the Pest! Week 14 – *David Owens, Extension Entomologist,* owensd@udel.edu

This week, we prepare to celebrate that most American of holidays, the 4th of July. Every year for the last 9 years, I have made a blackberry pie for the 4th, and so I sampled some of the local blackberries this week for pie making. A few of the berries looked like the below photo with the off-color drupelets dried out. What might be causing this?

Test your pest management knowledge by clicking on the guess the pest logo and submitting your best guess.

https://docs.google.com/forms/d/e/1FAIpQLSfUPYLZnTRsol46hXmgqj8fvt5f8-JI0eEUHb3QJaNDLG_4kg/viewform?c=0&w=1

Announcements

Health Insurance Webinar Series

Money, health and health insurance are interrelated. Learning what options are open to you and how best to choose and use your health insurance in times of Covid-19, is the smart action to take. This upcoming free webinar series will be for you if you are confused about health insurance options and how to get the most of your insurance policies. Brought to you by your colleagues at University of Delaware and Maryland Extension. Registration can be found at: https://go.umd.edu/health_insurance.

July 7 5:00-6:00 p.m.
Smart Choice Health Insurance Basics
Choosing the right health insurance plan makes you a smart consumer. Increase your understanding of health insurance and learn strategies for selecting a health insurance plan that will meet your

July 14 5:00-6:00 p.m.
Smart Use Smart Actions
Knowing how to use your health insurance will make you a smart health care consumer. Identify smart actions that will help you become a Smart User of health insurance. (5:00 to 6:00PM)

July 21 5:00-6:00 p.m.
Smart Use Understanding and Estimating Healthcare Costs
Taking control of your health care costs makes you a smart health care consumer. Better understand and estimate your health care expenses so you can plan for future health care costs. (5:00 to 6:00PM)

July 28 5:00-6:00 p.m.
Smart Use Managing Health Insurance and

Resolving Conflicts
Do you know what to do if you are denied coverage for care? What if you think you were billed incorrectly? Learn how to manage the process for handling disputes with your health insurance company and how to avoid them. (5:00 to 6:00PM)

To register for any session, visit:
https://go.umd.edu/health_insurance

For more information on the Health Insurance Literacy Initiative, visit https://extension.umd.edu/insure
Category 1 CEUs available for Maryland and Delaware Social Workers

Hey Hay! Selection and Matching Hay with Stock Needs

Wednesday, July 15, 2020 7:00-8:00 pm EST
Online

With Susan Garey, Extension Agent Animal Science and
Dan Severson, New Castle County Agriculture Agent-University of Delaware

What should you look for when selecting quality hay for animals? How do you match hay quality with animal needs? What are some decision making tools to help you when purchasing hay?

Registration is free but required to access the Zoom webinar.
Registration link:
https://www.pcsreg.com/hey-hay-selecting-and-matching-hay-with-animal-needs

Extension302 Podcast – CFAP: What You Need to Know

https://www.udel.edu/academics/colleges/canr/cooperative-extension/about/podcast/

Have questions about the Coronavirus Food Assistance Program? So did we—that's why we interviewed Robin Talley, District Director with Farm Service Agency (FSA) in Delaware. Listen in to find out what CFAP is, what it covers and how to apply.

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of June 25 to July 1, 2020

Rainfall:
0.05 inch: June 25 0.24 inch: July 1
Air Temperature:
Highs ranged from 90°F on June 27 to 80°F on June 25 and July 1.
Lows ranged from 72°F on June 27 and June 28 to 63°F on June 26.
Soil Temperature:
78.9°F average

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

Weekly Crop Update is compiled and edited by Emmalea Ernest, Associate Scientist – Vegetable Crops. Aisha Hoggard assists with web posting.