WEEKLY CROP UPDATE
UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

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Vegetable Crops

Freeze Damage to Processing Peas – *Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu*

We are seeing a few pea fields with freeze damage that occurred on Friday, April 17. The peas injured were starting to grow rapidly and 6-12" in height. Peas normally are very cold hardy and can tolerate freezing temperatures down to the low 20s. Lower temperatures (below 20°F) or a combination of high winds (gusts over 30 mph) and freezing temperatures (below 25°F) can cause damage to pea plants, sometimes killing them to soil level. Peas that are germinating or just cracking the ground will have little damage.

Peas with freeze damage. Note water-soaked appearance on damaged plants.

If pea tops are frozen to the ground level, they will develop new stems from dormant buds below ground. There will be 1-3 new stems that develop. This will be seen within a week after the frost. These stems will develop and flower later than undamaged plants. Generally, freeze damaged peas will yield 5-20% less due to the differences in maturities in the field and having weaker plants.

COVID-19 and Wholesale Produce Farms – *Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu*

COVID-19 will pose additional challenges for produce growers this season. The good news is that there is no evidence of the spread of the virus in food and with produce specifically. However, potential transmission of the virus with employees and contract workers is of great concern.

Protecting Against Transmission in the Labor Force

Labor on produce farms is often complicated. There are family members and year-round employees. There are seasonal employees that may be directly hired by the farm, contracted directly by the grower through labor brokers, or contracted by produce brokers. Housing may be provided on the farm, or more commonly, seasonal labor lives in off-farm locations. There are H2A workers coming from Mexico or other countries just for the season then returning home.

No matter what the labor situation, growers and brokers should educate workers on COVID-19 symptoms, how it spreads, and how to reduce the spread of the disease.

It is very important to instruct workers to stay home if they are sick (coughing, sore throat, fever, diarrhea, vomiting, etc.). Housing may be more important as workers often live together in close quarters where COVID-19 could spread rapidly. Where possible, arrange for housing that allows for distancing. Train employees on how to reduce the spread of COVID-19 in housing and personal activities.

Some employees may need reassurance that they will not be punished for missing work due to illness, while others may be unwilling to miss a paycheck due to illness. Have a plan and communicate in advance for how you will address these individuals (paid sick leave). Government programs may be of assistance so keep current with available funding for agriculture and small businesses.

Monitoring Employee Health for COVID-19
Businesses should follow CDC and FDA guidance for screening employees who have been exposed to COVID-19. Pre-screen employees for symptoms (fever, dry cough) before starting work. Employees with fever and symptoms should be advised to see a doctor for evaluation. There are heath care screening organizations that serve the migrant farmworker communities on Delmarva.

Keep informed of current COVID-19 testing in your area and if testing becomes more widely available, have workers tested as appropriate.

Enhanced Training, Personal Protection, Hygiene
Enhanced training on personal hygiene and sanitation should be performed. All employees must wash their hands with soap and water for 20 seconds, frequently throughout the day. This includes when they arrive to work, before handling food, after breaks/using the restroom, and after any contamination event.

Train employees so they do not touch eyes, nose and mouth throughout the day. Discourage employees from sharing vehicles. If employees must travel together, they should wear face masks. Discourage employees from sharing phones, tools, utensils, dishes, drinking glasses, cups, eating utensils, towels, or bedding.

Single-use gloves should be provided to all workers handling produce in packing areas and should be changed when contaminated (when hands touch skin or the ground). When gloves may interfere with a worker's ability to do their assigned task (harvesting, applying stickers, etc.), handwashing or hand sanitizer should occur frequently.

Workers should wear cloth face coverings while working in close proximity with others. Workers should be instructed on how to wear them properly to prevent illness or injury.

Workforce Organization, Distancing
Instruct workers to keep 6 feet away each other. Limit one employee per vehicle at a time and instruct drivers to disinfect frequently touched surfaces within the vehicle before their shift ends.

When physical distancing is not an option, consider dividing workers into teams that only work with members within that team for the duration of the outbreak. For example, divide your packing crew into two groups that only show up for their groups designated shift. Have the first shift clean and sanitize their works areas and equipment at the end of their shift, and give a buffer of 15 to 30 minutes between the end of the first shift and beginning of the next shift to ensure employees are not in contact with each other during shift changes.

Operations may want to consider having designated harvest and packing crews, the members of which never cross paths during the workday. Employees in the same household should be assigned to the same crew. Working in designated crews reduces the risk of losing your entire workforce.

In some packing areas, plexiglass barriers may also be used to separate workers.

Cleaning and Disinfecting
Cleaning and disinfecting are two separate steps and should be done in order. Cleaning removes dirt and soil and often requires the use of a soap/detergent and water. Disinfecting uses a chemical to inactivate virus on the surface.

Shared tools should be cleaned and disinfected between uses by a different employee. Clean harvest baskets, bags, aprons, knives, etc. after each use. Apply a disinfectant to nonporous produce contact surfaces. Disinfect frequently touched surfaces, including door handles, steering wheels, keyboards, touch screens, etc. throughout the day.

CDC is recommending use of disinfectants on the EPA list found at: https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2.

Cloths, uniforms, and other laundry used in produce handling should be washed in hot water.

This article was adapted from the fact sheet "HANDLING COVID-19 - PRODUCE FARMS AND PACKINGHOUSES" from NCState and University of Georgia Extension.

Improving Early Fruit Set in Seedless Watermelons – *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

The first watermelons will be planted at the end of April across the region. Markets for early watermelons are normally the strongest so early planting is often more profitable. However, fruit set is often below desired levels in the earliest plantings and crown sets in early plantings often have quality issues such as higher levels of hollow heart. The following are some considerations for managing watermelons to maximize early fruit set:

Get plants off to a good start with a minimum of stress. In early plantings always plant on a warming trend where temperatures are expected to increase and skies are mostly clear. Black plastic mulch will then allow soils to accumulate heat and roots will be able to establish more quickly. Use every row rye windbreaks (or row covers if windbreaks have not been planted) to reduce heat losses and protect plants.

Plant well hardened off plants and train transplanting crews to handle plants carefully with a minimum of damage. Provide adequate water at planting and avoid putting excess starter fertilizers in transplant water which can cause salt stress on plants. Manage early fields more intensively by monitoring irrigation and fertigation programs so that stress is reduced throughout the growing period. Extra nitrogen can delay flowering so there is a fine balance between promoting growth and initiating flowering.

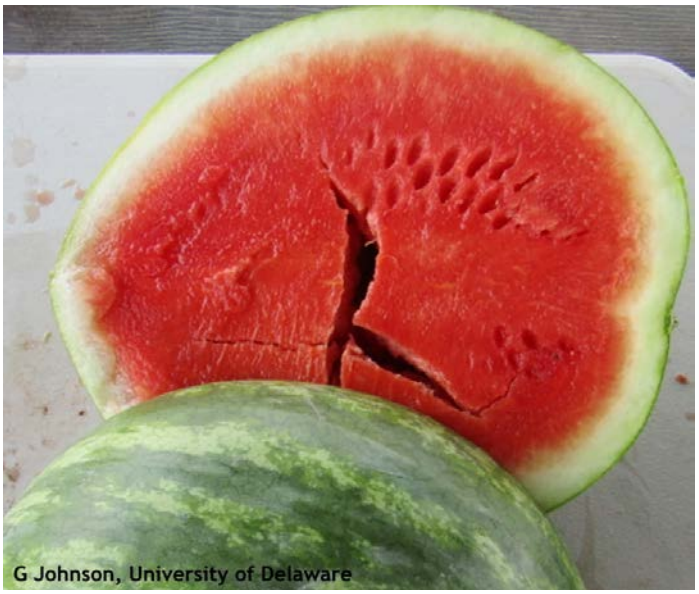
Avoid practices that put extra stress on plants and be careful of phytotoxicities with misapplication of foliar fertilizers, fungicides (such as copper products), and herbicides (proper shielding when spraying row middles, follow label guidelines for herbicides). Manage insecticide applications so that bees are not affected during flowering (see pollinator protection information on labels).

Manage pollinizer-seedless combinations for maximum pollination potential. Loss of pollenizers after planting will reduce fruit set. This has been a problem in the past when pollenizers were not hardened off properly because they were seeded later in the greenhouse. In-row or co-planted pollenizers should be used to achieve best early fruit set. Pollenizers should be chosen so that they are flowering adequately as the seedless come into flower. Pollen is the key for early fruit set and earlier flowering pollenizers should be used to improve crown sets.

A case can be made also for increasing the number of pollenizer plants for the earliest plantings. A 1:3 ratio of pollenizer to seedless should be the minimum used and extra pollenizers that flower early could be planted at intervals to provide additional pollen. Another issue is the vigor of pollenizers. Make sure that pollenizers have good disease packages. In fields with a history of Fusarium wilt, Fusarium resistance in both pollenizers and seedless is needed. Place early plantings in fields with little or no history of watermelon production to avoid soil borne disease stress.

Manage pollinators (bees) so that pollen is transferred effectively and in adequate quantity. Consider placing extra hives in early plantings. Have hives set when pollenizers are 10% in bloom so bees start to work fields immediately. If there are not enough bees when first female

flowers open, you will lose much of the crown set. Avoid having flowering crops nearby that are more attractive to bees and could siphon off bee activity.



Hollow heart is a common problem in early planted watermelons.

Fruit set is often reduced when weather conditions at first flowering is rainy and windy or night temperatures are cold. Honeybees rarely work when the temperature is below 57°F and don't fly when the temperature is below 55°F. They do not forage in rain or in wind stronger than 12 mph. Cloudiness also reduces flight activity, especially near threshold temperatures. A cold spell in late May or early June can reduce fruit set significantly because of reduced bee flights. While honeybees can work over a 2-mile distance, a case can be made for placing honeybee hives at more than one location in or around the field in early plantings to address shorter flights in bad weather.

Bumblebees are stronger fliers that can fly in heavier winds and are active at lower temperatures. Placing bumblebee hives throughout the field may improve early fruit set. Growers should be cautioned not to place bumblebee hives near honeybees because the honeybees will place stress on and rob from the bumblebee colonies if both honeybees and bumblebees are used.

Diseases of Cucurbit Seedlings – *Jake Jones, Extension Agriculture Agent, Kent County*; jgjones@udel.edu

Gummy Stem blight is caused by *Stagonosporopsis* spp. and can occur on cucurbit crops and seedlings. It can be introduced from infected seed or seedlings, highlighting the importance of greenhouse and field sanitation. Gummy stem blight can cause symptoms on the leaves, stems, and vines and is also called black rot when fruits are infected. Growers should be able to recognize gummy stem blight symptoms on seedlings before transplanting them into clean fields. Symptoms include water soaked stems (Figure 1), chlorotic leaf margins, and necrotic lesions on cotyledons and leaves. The necrotic lesions are often chocolatey brown and the majority reach the leaf margins. Concentric rings can be found within the lesions. Diagnostic signs can be seen with a hand lens and are pycnidia, the asexual fruiting body or pseudothecia, the sexual fruiting body. They form in the center of lesions first and can be found in the final stages of infection, as the pathogen is necrotrophic. In order to limit transmission of the disease, rotate away from hosts for 3 years, practice fall tillage to help reduce crop residue (and therefore inoculum), purchase seeds/seedlings from reputable companies, inspect seedlings regularly, monitor and be prepared to spray preventative fungicides.

Figure 1. Water soaked lesion where cotyledons attach to the hypocotyl, a symptom of gummy stem blight.

Anthracnose, caused by *Colletotrichum orbiculare* can be confused with gummy stem blight, although symptoms usually don't become severe until the canopy closes. Both diseases affect all aboveground plant parts and seed can again be the source of initial inoculum. Watermelon, cucumber, and honeydew melon can experience serious losses when susceptible cultivars are grown while squash, cantaloupe, and pumpkin are less susceptible. In cucumber and honeydew melon, leaf lesions start as small water soaked areas, eventually becoming somewhat circular and brown with a yellow halo. In watermelon, the lesions are often smaller than in cucumber, darker brown, and irregular shaped. When seedborne, anthracnose symptoms appear as a wilt of cotyledons and water soaked lesions on the stem near the soil line (Figure 2), below where the lesions occur in gummy stem blight. The best options to avoid anthracnose are to start by choosing resistant varieties, purchasing disease free seeds, monitor and inspect seedlings, rotate away from cucurbits for 3 years, and practice fall tillage to remove residue.

Figure 2. Water soaked lesion at the soil line, a symptom of anthracnose.

Another fungal disease worth mentioning is **Fusarium wilt**, with symptoms in watermelon of wilted seedlings or damping off.

Bacterial fruit blotch caused by *Acidovorax avenae* subsp. *citrulli*, is caused by a bacteria as the name suggests. Initial symptoms are similar across cucurbit species but often more severe in watermelon, appearing as water soaked lesions on the underside of cotyledons (Figure 3). Lesions will turn necrotic extending along the leaf veins and in severe cases can cause damping off in seedlings. Lesions on mature leaves are reddish brown and elongated along the leaf veins, but they are easily confused with other diseases like gummy stem blight and anthracnose. Seedborne transmission of bacterial leaf blotch is the most important source of inoculum and conditions in the warm and humid greenhouses help the disease become established and spread among seedlings.

Figure 3. Water soaked lesion on the underside of cotyledons, an initial symptom of bacterial fruit blotch.

Seedling grow out assays of 10,000-30,000 seeds per lot are used to screen for bacterial fruit blotch infected seed lots and help reduce the risk of outbreaks. Sanitation efforts such as cleaning and disinfecting trays, using new soil, separating seed lots, keeping humidity low, and watering seedlings at midday so they have time to dry before the evening can also help reduce the risk of an outbreak. Destroy all trays with symptomatic plants and remove and isolate adjoining trays for observation and monitoring of

disease symptoms. Remaining trays should be treated with labeled copper fungicides until they are transplanted.

Angular leaf spot is another bacterial disease and is caused by *Pseudomonas syringae* pv. *lachrymans*. There are resistant cucumber varieties available but angular leaf spot can occur in all cucurbit crops. Symptoms can look similar to bacterial fruit blotch, so proper identification is key. Lesions start as water soaked angular lesions on the underside of leaves before becoming brown or straw colored and surrounded by yellow halos. Similar to bacterial fruit blotch, it is important to start with disease free seed, as both diseases can infect fruit later in the year and directly impact marketable yield. Sanitation, crop rotation, and the ability to identify symptomatic plants are important ways to protect your crops before they go into the field.

Fruit Crops

Cold Damage in Fruits – *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu and *Emmalea Ernest, Associate Scientist - Vegetable Crops*; emmalea@udel.edu

Freezing temperatures occurred throughout Delmarva over the last 10 days. Cold damage in fruits is a concern.

Stone Fruits
Most peach, nectarine, and plum trees were in Post Bloom Stage over this period, cherries were in various stages of bloom. Research has shown that when stone fruits (peaches, nectarines, plums, cherries) are in the First Pink stage (flower petals coming out of bud but not open), the temperatures required to cause 10% and 90% kill at this bud development stage were 25°F and 15°F, respectively. At First Bloom, the temperatures required to cause 10% and 90% kill were 26°F and 21°F, respectively. At Full Bloom Stage the temperatures required to cause 10% and 90% kill were 27°F and 24°F, respectively and at Post Bloom Stage the temperatures required to cause 10% and 90% kill were 28°F and 25°F, respectively. We will not know the full extent of the damage for several weeks until fruit drop occurs.

Natural fruit drop is a result of unfertilized or poorly fertilized seeds, cold injury, competition between fruits, or shading. Poor pollination may be a result of cold, rainy weather during bloom in self-fertile fruits such as peaches or poor insect pollinator activity during flowering in insect pollinated fruits such as apples. In stone fruit, some fruit that is not fertilized will remain on the plant for 25-50 days after bloom and then will drop before pit hardening starts.

Pome Fruits
Pears were in post bloom stage on Delmarva; however, apples were in various stages of bloom over this period of freezing weather. The following is from Michigan State University:

Apples and pears are very different than stone fruit. The buds of stone fruit trees are either flowers or leaf buds, and not a mixture of both. In cherries and plums where there is more than one flower, all the flowers in a bud are about the same age. In apples, the fruit buds are really small shoots with both flowers and leaves. An apple flower cluster is shown in the photo below. In apples, the flower in the center of the flower cluster is the oldest and most developed and will be the first flower to bloom. This central flower is called the king bloom and is the most desirable of the flowers in the cluster. The king bloom has the potential to be the largest fruit.

The king bloom of the apple flower cluster has opened, but the side blooms are still closed. The king bloom is more susceptible to freeze injury at all stages of the apple bud development in the spring and is often the first flower killed in the cluster.

Since the king bloom is also the most advanced flower in the cluster, it is most likely to be killed in a frost. Another difference between apples and stone fruit is that the pistil is buried inside the base of the flower and not exposed above it as in stone fruit. This means that it is often necessary to tear the flower apart to see if the center of the flower is brown or black. The flower in the photo below is a king bloom killed by frost.

The dark brown center of this apple flower indicates it was killed by a freeze.

When checking apples from frost damage, check the king and side blooms separately. Many times the king blooms are killed and many of the side bloom are undamaged.

The dark brown centers and signed appearance of the petals indicate that both kind and side blooms were killed in a freeze the morning this picture was taken. The king bloom in the center of the cluster has lost its petals.

See this site for a full list of critical temperatures in tree fruit: https://www.canr.msu.edu/uploads/files/TreeFruitCriticalTemperatures.pdf

Strawberries

For strawberries the critical temperature during bloom at the blossom level is 28°F. Below 28°F, there is a progressively higher risk of flower damage, and below 26°F most blooms will be damaged or killed. Flowers that are not open and just emerging from the crown can tolerate temperatures down to 22°F and once fruit has formed temperatures down to 26°F can be tolerated for short periods of time. Flower acclimation is also important. Plants with flowers exposed to several cold days before a frost will be more tolerant than those exposed to warm days before a frost. In addition, not all flowers in a field will have equal risk of damage. Flowers under leaves or near the soil will often be warmer than those higher on the plant or those more exposed.

Blueberries

Some blueberry varieties were also blooming during this period. According to NCState: "For highbush blueberries, when the blossoms are open, a temperature of 27°F for more than a few minutes causes damage. Immediately after corolla drop and before the berry begins to swell is the most sensitive stage. A few minutes below 28°F will result in damage. As the berry begins to enlarge, susceptibility is similar to the critical temperature of 28°F for open blossoms."

In 2016 there was yield loss in blueberry varieties in the UD variety trial at Georgetown due to a freeze event on April 6 of that year. For most varieties in the trial, yield was half that of the previous year. Only the very late variety, Aurora, did not have reduced yield.

The blueberry fruit on the right was damaged by freezing temperatures and will not mature. Seeds inside the ovary have turned brown. The flower on the left was not frozen, seeds remain plump and green.

Strawberry Season is Here – Considerations for Direct Marketers – *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

Delaware and Maryland continue to have stay-at-home orders. Social distancing, face mask use, and increased hand washing/sanitizing will be the new norm for this season. The goal is to prevent the spread of COVID-19 and keep customers and farm employees safe.

With strawberry season at hand, the following are some considerations for growers that market directly to consumers.

Communication
It is important to get the message out that food is essential and having fresh local berries for customers is a valuable service that you are continuing to provide.

Inform your customers through available communication channels (traditional media, social media, website) of the following:

When you are opening and prices (prepicked, u-pick), hours

Changes in farm procedures to provide a safe environment during the COVID-19 outbreak and to avoid food borne illnesses

- Not to come if sick
- Practice social distancing of 6'
- Wear face mask
- Parking and entrances, areas customers may access
- Hand washing and/or hand sanitizing areas, all pickers must wash hands
- All pickers must use containers provided by farmer.
- Absolutely no sampling in the field.

Signs, Signs, Signs
Provide signage that informs customers on:

- Farm guidelines
- Do not enter if sick
- Hand washing
- Distancing, 6' distancing marks
- Check-in and check-out procedures
- Prices
- Field distancing for U-pick
- Areas the public is allowed and not allowed
- Do not touch the prepacked berries before buying

Many of these signs are on-line and can be printed.

In U-pick areas, communicate how pickers should enter and leave the field. Mark out picking areas with flags or tape that reinforces distancing. Limit the number of customers in the field and make sure that customers are spread out.

Sales Considerations
Extra attention should be paid to sales and sales areas. The following are some ideas to consider:

- Encourage customers to use correct change.
- Package in a container (quart, 2 quart) and charge a flat fee per container instead of by the pound.

● Have u-pick by appointment. Use scheduling apps to schedule u-pick.
● Sell as many pre-picked berries as possible.
● Use online ordering and scheduled pickup.
● Have markings on the ground indicating 6-foot spaces in payment areas
● Consider using online money transfers to limit contact with customers.
● Collect money first then issue picking containers for u-pick
● Have a drop box for cash paying customers.
● Ask customer to swipe their cards, omit signatures
● Use gloves and proper disposal of gloves when payments
● Sanitize after each transaction.

Sanitary Practices
Sanitary practices should be increased. Maintain good hand washing stations. Keep filled with water and keep stocked with soap and single use paper towels. Maintain trash cans for proper towel disposal. If hand sanitizer stations are used, monitor regularly and keep stocked.

Sales and service employees and farm workers that pick strawberries should also wash their hands regularly: before starting work, before putting on gloves, after using the restroom, after breaks, and any other time that hands may have become contaminated.

Clean and sanitize all contact surfaces. Clean and disinfect high touch areas several times a day. Wipe scales after each weighing. Clean and disinfect reusable picking containers after each use. Clean and disinfect sales areas often.

Agronomic Crops

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

Early Season Moth Activity
Moth counts across the state are down considerably, probably due to cold nighttime temps this past week. Trap counts for the week are as follows, with thanks to Joanne Whalen, Emily Zobel, and Maegan Perdue.

Location	TAW/night	BCW/night
Willards, MD	0.83	0.17
Salisbury, MD	0	0
Laurel	0.57	0.29
Seaford	5.14	2.14
Harrington	8.86	0.29
Pearson's Corner	2.14	0
Sudlersville, MD	0	0
Smyrna	0.88	0

Slugs
Slug eggs are continuing to hatch out across the state, and gray gardens have appeared statewide from out of the 'groundwork'. If scouting for the presence of slugs, it is best to scout early in the morning, especially or damp days. If in a field with corn stubble, pay special attention to flipping over old corn cobs and yanking a few corn stalks for eggs and juveniles. A rule of thumb for 'significant' populations is 3 per square foot. If using shingles, it is best to check them as early in the morning as possible.

Do You Need Micronutrients in Your Starter? - *Jarrod O. Miller, Extension Agronomist,* jarrod@udel.edu and *Amy Shober, Extension Nutrient Management and Environmental Quality Specialist;* ashober@udel.edu

Whether or not you need micronutrients in your starter should come down to last year's soil or tissue tests. Over the last two years, our research projects have not revealed a deficiency in many micronutrients, but we still understand it is out there. In 2018, we conducted a study at the Carvel Research and Education Center (Georgetown, DE) with two rates of manganese (Mn), zinc (Zn), and boron (B) in the starter. We observed **no effect** on yield, which was expected as these soils were adequate in Mn and Zn based on UD recommendations. Although starter B had no effect on yield, B did have a positive correlation with yield in the starter study. This implies that with increase tissue B concentrations, yield also increased. Correlations imply relationships, but not necessarily why this occurred. An environmental variable may have influenced both B uptake and

yield in this case, such as saturated soils leaching B while reducing yield.

In a study sponsored by the Maryland Grain Producers we saw the same relationship between higher tissue B and greater yield, across a range in soil types. In both 2018 and 2019, very few corn ear leaf samples reached the critical threshold for boron, which would indicate we are having a difficult time maintaining B in our soils. Due to this result, we performed a study with split applications of B in Georgetown, but also observed **no effect** on yield.

While we have observed that B is tied to greater yield in corn tissue samples, the method of application or uptake has not been as straightforward. As an anion, soil tests for B may not be accurate. Levels of boron from a fall soil test may be leached from the upper soil by the time planting occurs. Mid-season soil samples from a soybean study have had a stronger correlation between soil B and whole plant B. The combination of mid-season tissue and soil samples may be a better way to manage B, but further research is needed. It remains possible that starter B applications may also be leached from the soil surface prior to plant uptake, so that tissue samples will be necessary following higher rainfall.

Very few of our tissue samples across Maryland and Delaware have been lacking in Zn, while all samples from the Maryland Grain Producers Study were above critical thresholds for Cu, Mn, and Fe in both 2018 and 2019. A major variable controlling micronutrient availability is pH, and we have observed greater uptake of Zn in soybeans with lower pH, even in soils not lacking in Zn. It is imperative that soil pH effects on micronutrients are considered when making lime applications, as this may have greater contributions to uptake and availability than starter applications.

Research in this study was supported by Maryland Grain Producers and the Delaware Soybean Board.

Wheat and Barley Disease Update – *Alyssa Koehler, Extension Field Crops Pathologist*; akoehler@udel.edu

The cooler weather has kept small grains from moving quite as fast as we expected a few weeks ago. Barley varieties are continuing to head out and most wheat is at Feekes 9-10. These cooler temperatures have kept powdery mildew visible in many fields. Powdery mildew appears as white, fluffy growth on the leaf surface (Figure 1). Powdery Mildew grows best at temperatures 50-70°F and typically declines after temperatures are above 75°F. Powdery Mildew that stays low in the canopy has little effect on yield.

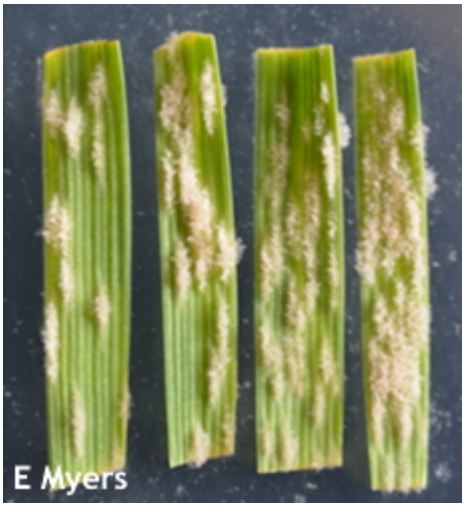


Figure 1. White fluffy growth on powdery mildew on wheat leaves

Over this week, we have remained at a low predicted risk for Fusarium Head Blight. If making a fungicide application this season, the North Central Regional Committee on Management of Small Grain Diseases has put together a list of products and efficacy ratings for the most common small grain diseases. This publication can be found at: https://crop-protection-network.s3.amazonaws.com/publications/fungicide-efficacy-for-control-of-wheat-diseases-filename-2019-07-01-160518.pdf . Table 1 shows a summary of the results.

Table 1: Fungicide Efficacy for Control of Wheat Diseases (CPN-3002W)

Fungicide Efficacy for Control of Wheat Diseases[1]

Fungicide(s)			Rate/A (fl. oz)	Powdery Mildew	Stagonospora Leaf/Glume Blotch	Septoria Leaf Blotch	Tan Spot	Stripe Rust	Leaf Rust	Stem Rust	Head Scab[2]	Harvest Restriction
Class	Active Ingredient	Product										
Strobilurins	picoxystrobin 22.5%	Aproach SC®	6.0-12.0	G	VG	VG[3]	VG	E[4]	VG	VG	NL	Feekes 10.5
	pyraclostrobin 23.6%	Headline SC®	6.0-9.0	G	VG	VG[3]	E	E[4]	E	G	NL	Feekes 10.5
Triazoles	metconazole 8.6%	Caramba 0.75SL®	10.0-17.0	VG	VG	U	VG	E	E	E	G	30 days
	propiconazole 41.8%	Tilt 3.6EC®[5]	4.0	VG	VG	VG	VG	VG	VG	VG	P	Feekes 10.5.4
	prothioconazole 41%	Proline 480SC®	5.0-5.7	U	VG	VG	VG	VG	VG	VG	G	30 days
	prothioconazole 19% tebuconazole 19%	Prosaro 421SC®	6.5-8.2	G	VG	VG	VG	E	E	E	G	30 days
	tebuconazole 38.7%	Folicur 3.6F®[5]	4.0	NL	NL	NL	NL	E	E	E	F	30 days
Mixed modes of action[6]	benzovindiflupyr 2.9% propiconazole 11.9% azoxystrobin 10.5%	Trivapro SE®	8.0	VG	VG	VG	VG	E	E	VG	NL	Feekes 10.5.4 14 days
	cyproconazole 7.17% picoxystrobin 17.94%	Aproach Prima SC®	3.4-6.8	VG	VG	VG	VG	E	VG	U	NR	45 days
	fluapyroxad 2.8% pyraclostrobin 18.7% propiconazole 11.7%	Nexicor EC®	7.0-13.0	G	VG	VG	E	E	E	VG	NL	Feekes 10.5
	fluoxastrobin 14.8% flutriafol 19.3%	Preemptor SC®	4.0-6.0	U	U	VG	VG	E	VG	U	NL	Feekes 10.5 and 40 days
	fluxapyroxad 14.3% pyraclostrobin 28.6%	Priaxor®	4.0-8.0	G	VG	VG	E	VG	VG	G	NL	Feekes 10.5
	propiconazole 11.7% azoxystrobin 13.5%	Quilt Xcel 2.2SE®[5]	10.5-14.0	VG	VG	VG	VG	E	E	VG	NL	Feekes 10.5.4
	prothioconazole 10.8% trifloxystrobin 32.3%	Stratego YLD®	4.0	G	VG	VG	VG	VG	VG	VG	NL	Feekes 10.5 35 days
	prothioconazole 16.0% trifloxystrobin 13.7%	Delaro 325SC®	8.0	G	VG	VG	VG	VG	VG	VG	NL	Feekes 10.5 35 days
	pydiflumetofen 13.7% propiconazole 11.4%	Miravis Ace SE	13.7	VG	VG	VG	VG	VG	VG	VG	G[7]	Feekes 10.5.4
	tebuconazole 22.6% trifloxystrobin 22.6%	Absolute Maxx SC®	5.0	G	VG	VG	VG	VG	E	VG	NL	35 days

[1] Efficacy categories: NL=Not Labeled; NR=Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent; U=Unknown efficacy or insufficient data to rank product.
[2] Application of products containing strobilurin fungicides may result in elevated levels of the mycotoxin Deoxynivalenol (DON) in grain damaged by head scab.
[3] Product efficacy may be reduced in areas with fungal populations that are resistant to strobilurin fungicides.
[4] Efficacy may be significantly reduced if solo strobilurin products are applied after stripe rust infection has occurred.
[5] Multiple generic products containing the same active ingredients also may be labeled in some states.
[6] Products with mixed modes of action generally combine triazole and strobilurin active ingredients. Nexicor®, Priaxor®, and Trivapro® include carboxamide active ingredients.
[7] Based on application timing at the beginning of anthesis (Feekes 10.5.1).

General

Guess the Pest! Week 3 Answer: Blister Beetle – *David Owens, Extension Entomologist*, owensd@udel.edu

Congratulations to Chris Griffith for correctly identifying last week's GTP as a blister beetle. All blister beetles have a head and abdomen that is wider than the prothorax, giving them a 'neck'. This species is in the genus Meloe, the larvae are parasitoids on bees. Other blister beetles attack grasshoppers, including the species most common in soybean fields, the striped blister beetle. Adults feed on foliage, and can be pests, especially on green leafy vegetables. Dr. Brust wrote a good article in last year's WCU about them: https://sites.udel.edu/weeklycropupdate/?p=14128.

Blister beetles get their name from a chemical in their blood, cantharidin, that causes nasty blisters and boils when it contacts skin. When threatened, beetles will break joints to release cantharidin. Blister beetles can be major problems with hay production. If accidentally crushed while being incorporated into hay the cantharidin has been known to cause sickness and even death of animals. Be careful with these critters!

Guess the Pest! Week 4 – *David Owens, Extension Entomologist*, owensd@udel.edu

Time to test your pest management knowledge! Click on the Guess the Pest logo or click the link below to enter your name, email, and your answer. The winner and answer will be revealed next week.

https://docs.google.com/forms/d/e/1FAIpQLSfUPYLZnTRsoI46hXmgqj8fvt5f8-JI0eEUHb3QJaNDLG_4kg/viewform?c=0&w=1

Now that small grains are heading out, you may be noticing some fields that have odd, non-small grain looking grasses. This is one such example. What do we have here?

Welcome Jill Pollok, Plant Diagnostician – *Emmalea Ernest, Associate Scientist - Vegetable Crops and Co-Ag Program Leader;* emmalea@udel.edu

I am excited to welcome our new Plant Diagnostician, Jill Pollok. Jill will be running UD Extension's Plant Diagnostic Clinic in the position formerly held by Nancy Gregory, who retired in December.

Jill has moved north on the Delmarva Peninsula from her previous position at Virginia Tech's Eastern Shore Agricultural Research and Extension Center in Painter, VA. With Virginia Tech Jill worked as a plant pathology research specialist and her responsibilities included experimental field trials on vegetables and field crops and running a plant disease clinic that received 150-200 samples per year.

Jill received bachelor's degrees from Penn State in 2011 in Biology and Agroecology. She worked for the Penn State Plant Disease Clinic for a year before going to graduate school at Virginia Tech. She received her master's degree in Plant Pathology from Virginia Tech in 2015, working on varietal resistance to root-knot nematodes in tobacco.

In her free time Jill enjoys hiking, walking her two dogs, and creating art. She's very excited to start this new journey at The University of Delaware and to serve the community! You can contact Jill by email at jillp@udel.edu.

Welcome, Jill!

New Resource on Respiratory Protection Decisions for Pesticide Applicators - *Kerry Richards, Pesticide Safety Education Coordinator;* kerryr@udel.edu

Due to the COVID – 19/Coronavirus pandemic, respirators will likely be in short supply, especially early in the next several months. EPA has indicated that label PPE requirements will remain as the legal requirement for pesticide applicators. Always follow the pesticide label instructions.

A Respirator Decision Making Tree infographic has been developed to help applicators determine if their needs for respiratory protection and regulatory compliance are being met. The Respirator Infographic and additional information regarding respiratory protection can be found at: npsec.us/respirators If you answer YES to a question, follow the green arrow; if you answer NO to a question, follow the red arrow.

Online Paraquat Training Now Available in English and Spanish - *Kerry Richards, Pesticide Safety Education Coordinator;* kerryr@udel.edu

Paraquat product labels require applicators to take an EPA-approved training every 3 years in order to mix, load, apply, or handle paraquat. This online course reinforces how to properly and safely use paraquat.

You should expect to spend about 60 minutes on the course and the assessment quiz. The revised registrant training for Paraquat is now available in English and Spanish at: www.usparaquattraining.com. This address is printed on all Paraquat product labels.

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

A number of questions this spring have started with "what's the cheapest herbicide program to control …". Lots of folks are looking to cut input costs and expenses and herbicides are an obvious target. Keep a few things in mind.

1. Respraying to control weeds that escaped the first application is not cheap

2. If you do not have herbicide-resistant weeds, you do not want to get them. Herbicide-resistant ragweed and Palmer amaranth are not cheap or easy to control and once you allow them to go to seed, they will be there for years to come.

3. In many situations WHEN a herbicide is applied can be as (or more) important than WHAT herbicides are applied. A really good herbicide applied too early before planting or to weeds that are too large or not actively growing can result in poor control

4. Know your problem fields and be realistic about your workload. Do you own a sprayer? Can you get to the problem fields in a timely fashion? Are the problem fields close to your base of operation? If you answer yes to all, you have more flexibility in your herbicide selection. If you have problem fields, but they are not in close proximity to your main operation, then you need to think about using a program that provides longer residual control or more effective on larger plants, and often times this means a more expensive program.

5. Crop management is critical for full-season weed management. A vigorously growing crop that develops an early crop canopy that shades the ground is one of the best tools. Using a well-adapted variety or hybrid, planted at the right time, with a good fertility program is vital.

6. Row spacing is very important for soybeans and sorghum; planting in 15-inch rows dramatically improves full-season control compared to 30-inch rows. This is due to how quickly these crops form a dense soybean canopy to shade shorter weeds. Other crops planted in narrow rows such as corn have not shown the same benefit for weed suppression.

Use an effective herbicide program. Most situations require more than a single herbicide application, so consider all herbicide applications when developing your program. If you are planning on a two-pass program and you are likely to get your herbicide applied in a timely fashion, you probably will not need the

high price program to achieve excellent control if you can replace cost with timely management.

USDA Purchase of Produce, Dairy and Meat Through the Coronavirus Farm Assistance Program

As part of the Coronavirus Farm Assistance Program Secretary Perdue announced on April 17 that the USDA is exercising authority under the Families First Coronavirus Response Act to purchase and distribute up to $3 billion of agricultural products to those in need. USDA will partner with regional and local distributors, whose workforce has been significantly impacted by the closure of many restaurants, hotels, and other food service entities, to purchase fresh produce, dairy, and meat.

USDA will issue a solicitation to invite proposals from offerors to supply commodity boxes to non-profit organizations, identified by the offeror, on a mutually agreeable, recurring schedule. USDA will award contracts for the purchase of the agricultural products, the assembly of commodity boxes and delivery to identified non-profit organizations that can receive, store and distribute food items.

Agricultural Marketing Service's Commodity Procurement Program will procure an estimated $100 million per month in fresh fruits and vegetables, $100 million per month in a variety of dairy products, and $100 million per month in meat products. The distributors and wholesalers will then provide a pre-approved box of fresh produce, dairy, and meat products to food banks, community and faith-based organizations, and other non-profits serving Americans in need.

For additional information go to: https://www.ams.usda.gov/selling-food-to-usda/usda-food-box-distribution-program

Announcements

Extension302 Podcast Episode 0: So… what is Extension, anyway?

What is Cooperative Extension?

What does it do?

Why should I care?

If you've ever wondered what goes on at your local Extension office, you've come to the right place! We'll answer all these questions and explore the history of the service with special guest, Director of UD Cooperative Extension, Dr. Michelle Rodgers. We'll also have a quick chat with four current staff members, representing Extension's four focus areas.

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

Hemp Growers Training: Part I

Monday, May 11, 2020
9:00 a.m. - 2:00 p.m. (Via Zoom)

Maryland Department of Agriculture and University of Maryland Extension present: Hemp Production 101. This session is for beginner growers only. Part II (Hemp Production 201) will be open to advanced growers and those who have already taken Part I

Topics will include:

- Soils and soil testing
- Plant nutrition and management
- Phytochemical analysis
- Laws, regulations, and economics of hemp production

● And more!

Cost: $20.00
Cost is for Part 1 of the Program only and includes a digital copy of all slides and references with registration. This meeting will also be recorded for those who register but wish to view at a later time.

For additional details, speaker list, and registration, visit:
https://beginnerhempgrowers.eventbrite.com
Meeting access link will be provided via email in the days prior to the event to those who registered.

The University of Maryland is an Equal Opportunity Employer and Equal Access Programs

Stormwater Workshop Series

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

The public is invited to participate in a free stormwater workshop series. 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.

June 18, 2020 - Preventative maintenance, irrigation management and water conservation practices.

Aug. 13, 2020 - Water quality, invasive species management and stormwater facility winterization tips.

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

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of April 16 to April 22, 2020

Rainfall:

0.11 inch: April 18
0.08 inch: April 20
0.16 inch: April 21

Air Temperature:

Highs ranged from 68°F on April 21 to 52°F on April 16.

Lows ranged from 45°F on April 20 to 30°F on April 17 and April 19

Soil Temperature:

52.5°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