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

Asparagus
Continue scouting for asparagus beetles and eggs. Thresholds from Michigan State University suggest a lower threshold than previously reported; 5% of spears with adults and 2% of spears with eggs. Labeled materials include carbaryl, (pay attention to rates pre-harvest) malathion, pyganic (OMRI) and permethrin.

Beans
First generation seedcorn maggot adults are very active right now. With the cool, wet weather this weekend and last week, any seed planted under tilled conditions (even if fairly minimal conservation tillage is used) should have an insecticidal seed treatment on it to reduce SCM damage.

Cucurbits
Continue scouting greenhouses and any transplanted melons or cantaloupes for aphid buildup. Aphids can severely impact seedling vigor when they build up in large numbers. If infested plants are not treated and aphids build up to the extent that leaves cup and curl and stunt the plant, it can be severe enough to reduce yield. Scout greenhouses now for aphids and spider mites on transplants. Aphids can be easily controlled with tray drenches of a neonicotinoid. A tray drench should also prevent cucumber beetle damage on transplant wagons, but tray drenches have limited residual activity once the transplants are planted and growing. Be sure to read the labels carefully to ensure that you have enough active ingredient left for a cucumber beetle application in the drip lines if needed after planting. For greenhouses with spider mite activity, the easiest time to treat the transplants is while they are on the transplant wagon.

Cucumber beetles typically start emerging in mid-May, although it is possible that they may do so earlier this year. Cantaloupe and summer squash are especially susceptible to bacterial wilt transmitted by cucumber beetle aggregations. Scout several areas in a field, sometimes aggregations are small but intense. If an insecticide application is to be made through the drip lines, pay special attention to label guidance on amount of product per 1000 feet of drip tape per given bed spacings. Following label guidance will help you avoid undertreating. We also produced a video on chemigation concerns last year which can be found here: https://www.youtube.com/watch?v=GaZlAFtBlNk.

Cole Crops
Diamond back moth is now active in addition to imported cabbageworm. Thresholds at this stage are fairly high at 20% infested seedlings of any caterpillar pest. If possible, avoid broad spectrum insecticides so as to conserve beneficial wasps as much as possible. Last year, we installed a cabbage plot where a parasitoid wiped out every single diamondback caterpillar early in the crop stage thus keeping even untreated plots clean at harvest. If using Bt, coverage is especially important. Bt can be quite effective on smaller plants when targeting smaller worms. Bt aizawai strains tend to be a

bit more effective than kurstaki strains. Other cole crop pests active right now include flea beetles (seen primarily in brassica cover crop). If flea beetles and worms are present, diamides and spinosyns are effective on both among the more 'narrow spectrum' materials and Torac is also quite effective but a bit more broad-spectrum.

Sweet Corn
Scout sweet corn for cutworms. Consider a pyrethroid application if 3% of sweet corn plants are cut or if they exhibit 10% leaf feeding from small cutworms. See notes on cutworm activity in Field Corn in the Agronomic Crop Insect Report.

Foliar Fertilization for Vegetable Crops

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

Growers will apply most (>90%) of their plant nutrients for vegetable crops as soil applications (preplant, sidedressed, fertigated) based on soil tests and crop nitrogen needs.

To monitor vegetable nutrient status during the growing season, tissue testing is recommended just prior to critical growth stages. Growers can then add fertilizers to maintain adequate nutrient levels during the growing season or correct nutrient levels that are deficient or dropping.

Foliar fertilization is one tool to maintain or enhance plant nutritional status during the growing season. Often quick effects are seen and deficiencies can be corrected before yield or quality losses occur. Foliar fertilization also allows for multiple application timings post planting. In addition, there is reduced concern for nutrient loss, tie up, or fixation when compared to soil applications.

However, foliar fertilization has limitations. There is the potential to injure plants with fertilizer salts, application amounts are limited (only small amounts can be taken up through leaves at one time), multiple applications are often necessary (increasing application costs) and foliar applications are not always effective, depending on the nutrient targeted and plant growth stage.

Where foliar fertilization does have a good fit is for deficiency prevention or correction, particularly when root system function is impaired. This commonly occurs when there is extended rainy weather and soils are waterlogged. Foliar fertilization is also necessary when soil conditions, such as low pH, causes the tie up of nutrients so that soil uptake is limited. Foliar fertilization can also be used to target growth stages for improved vegetable nutrition thus improving color, appearance, quality, and yield.

Foliar fertilizers are applied as liquid solutions of water and the dissolved fertilizers in ion or small molecule form. Foliar nutrient entrance is mostly through the waxy cuticle, the protective layer that covers the epidermal cells of leaves. Research has shown that there is limited entrance through the stomata. While the waxy cuticle serves to control water loss from leaf surfaces, it does contain very small pores that allows some water and small solute molecules to enter into the underlying leaf cells. These pores are lined with negative charges. Fertilizer nutrients in cation form or with neutral charges enter most readily through these channels: this includes ammonium, potassium, magnesium, and urea (NH_4^+, K^+, Mg^{++}, CH_4N_2O respectively). In contrast, negatively charged nutrients (phosphate-P, sulfate-S, molybdate-Mo) are much slower to move through the cuticle (they must be paired with a cation). Movement through the cuticle is also dependent on molecular size, nutrient concentration, time the nutrient is in solution on the leaf, whether the nutrient is in ionic or chelated form (complexed with an organic molecule), and the thickness of the leaf cuticle.

Another factor in foliar fertilizer effectiveness is what happens once the nutrient enters into the leaf area. Some smaller molecules or those with less of a charge are readily transported in the vascular system to other areas of the plant (NH_4^+, K^+, Mg^{++}, Urea). Other larger molecules and more strongly positive charged nutrients stay near where they enter because they bind to the walls of cells in intercellular areas that contain negative charges. Tightly held nutrients

include Calcium, Manganese, Iron, Zinc, and Copper (Ca++, Mn++, Fe++, Zn++, Cu++). Therefore, when applied as foliar fertilizer, calcium does not move much once it enters plant tissue, the negatively charged nutrients such as phosphorus and sulfur are very slow to enter the plant, and iron, manganese, copper, and zinc are slow entering and do not mobilize once in the plant.

The following is a list of the major plant nutrients that are effective as foliar applications, fertilizer forms best used for foliar applications, and recommended rates;

Foliar applications of nitrogen (N) can benefit most vegetables if the plant is low in N. Urea forms of N are the most effective; methylene ureas and triazones are effective with less injury potential; and ammonium sulfate is also effective. Recommended rates are 1-10 lbs per acre.

Foliar potassium (K) is used on fruiting vegetables such as tomatoes and melons. Best sources are potassium sulfate or potassium nitrate. Recommended rate is 4 lbs/a of K.

Foliar magnesium (Mg) is used on tomatoes, melons, and beans commonly. The best source is magnesium sulfate and recommended rates are 0.5-2 lbs/a of Mg.

Foliar calcium is often recommended, but because it moves very little, it must be applied at proper growth stages to be effective. For example, for reducing blossom end rot in tomato or pepper fruits, foliar calcium must be applied when fruits are very small. Best sources for foliar calcium are calcium nitrate (10-15 lbs/a), calcium chloride (5-8 lbs/a) and some chelated Ca products (manufacturers recommendations).

Iron (Fe), manganese (Mn), or zinc (Zn) are best applied foliarly as sulfate or chelated forms. Rates are: Fe, Mn, 1-2 lbs/a, and Zn ¼ lb/a. While these metal micronutrients are not mobile, foliar applications are very effective at correcting local deficiencies in leaves.

The other micronutrient that can be effective as a foliar application is boron. Boron in the Solubor form is often recommended at 0.1 to 0.25 lbs/a for mustard family crops such as cabbage as a foliar application. Boron is very toxic to plants if applied in excess so applying at correct rates is critical.

For foliar fertilizers to be most effective they should remain on leaves or other targeted plant tissue in liquid form as long as possible. Urea and ammonium nitrogen forms, potassium, and magnesium are normally absorbed within 12 hours. All other nutrients may take several days of wetting and rewetting to be absorbed. Therefore, it is recommended that foliar fertilizers be applied at dusk or early evening when dew is on the leaves, in high volume water, and using smaller droplets to cover more of the leaf. Applications should also be made when temperatures are moderate and wind is low. While foliar fertilizers are sometimes applied with pesticides, for best effectiveness and reduced phytotoxicity potential it is recommended that they be applied alone. Use only soluble grade fertilizers for foliar applications (many are already provided in liquid form) and adjust water pH so it is slightly acidic.

Foliar fertilizers are most effective when applied to younger leaves and fruits. Research has shown that as leaves or fruits age, cuticles thicken, and these thicker cuticles absorb significantly lower amounts of nutrients such as potassium. However, younger plant tissue is also the most susceptible to potential fertilizer burn.

Because foliar fertilizers are in salt forms they can damage plant tissue if applied at rates that are too high. Generally a 0.5-2% fertilizer solution is recommended. Certain vegetables are more sensitive to fertilizer salt injury than others. Vegetables with large leaves with thinner cuticles (such as muskmelons) have greater risk of salt injury when compared to crops, such as cabbage, that have thick cuticles. Apply foliar fertilizers at recommended rates and dilutions for each specific vegetable crop.

In addition, some fertilizer sources are much more likely to cause injury than others. In the past this was given as the salt index for a fertilizer, the lower the salt index the less osmotic stress the fertilizer would place on the plant tissue. A better index would be the osmolality values for the fertilizer material. For foliar nitrogen materials, osmolality values (mmol/kg) for common N sources are as follows:

Urea = 1018, UAN-28 = 1439, Ammonium sulfate = 2314, Potassium nitrate = 3434. This shows that potassium nitrate has over 3x the osmotic stress potential compared to urea when applied as a foliar fertilizer. This means that potassium nitrate has much more potential to cause salt injury to plants than urea and must be used at lower rates.

Magnesium deficiencies are common in tomatoes. Foliar applications of magnesium are effective in correcting this problem.

Calcium and Potato Tuber Development

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

Several disorders of potatoes are associated with localized calcium deficiencies in the tubers. This includes internal rust spot, internal browning, heat necrosis, hollow heart, and bruising. Calcium is a component of plant cell walls and the pectin in the middle lamella that cements cells together. Local deficiencies of calcium during the development of potato tubers can cause collapse of cells leading to these disorders.

In plants, calcium moves from the soil exchange sites into soil water and to plant roots by diffusion and mass flow. At plant roots, the calcium moves into the xylem (water conducting vessels), mostly from the area right behind root tips. In the xylem, calcium moves with the transpirational flow, the movement of water from roots, up the xylem, and out the leaves through stomata. Calcium is taken up by the plant as a divalent cation, which means it has a charge of +2. It is attracted to negatively charged areas on the wall of the xylem, and for calcium to move, it must be exchanged off the xylem wall by other positively charged cations such as magnesium (Mg++), potassium (K+), ammonium (NH4+), or other calcium cations (Ca++). This cation exchange of calcium in the xylem requires continuous movement of water into and up through the plant. It also requires a continuous supply of calcium from the soil. The main sink for calcium is developing shoot tips.

In potatoes, tubers develop below ground on the tips of underground plant stems called stolons. Because calcium movement in the plant is driven by transportation there is limited movement of calcium through root uptake to the developing tubers. It is therefore necessary to have adequate available (exchangeable) calcium around stolons as tubers are formed and adequate moisture to maintain calcium levels in the soil water. To get the full benefit, calcium needs to be in the zone of tuber development and moisture needs to be maintained at optimal levels critically during early tuber development (cell division) and then through the growing season.

To have adequate calcium it is important to apply lime to bring the pH to acceptable levels; however, this often is not sufficient for potatoes. One reason is because of the need in scab susceptible varieties to keep soil pH below 5.4 to control this soil-borne disease.

To deal with this issue, additional calcium is often added in the form of gypsum (calcium sulfate) at the rate of 500-1500 lbs per acre. Gypsum supplies calcium without changing the soil pH. An application of 900 lbs of gypsum will supply approximately 200 lbs calcium/A. Foliar applications of calcium and sidedress applications of calcium nitrate (at rates commonly applied on Delmarva) do little to provide adequate calcium to prevent disorders. Gypsum can be applied pre-plant or during hilling.

Calcium needs to in the tuber development zone during the cell division stage. Once tubers reach ¼ inches in diameter there is very little new cell formation. For Ca to be able to get in the tuber it needs to be available between the hook and initiation stages (see figure below).

Photo showing hook and tuber initiation stages in potatoes.

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

Bulb mites (usually *Rhizoglyphus* spp) are a problem of garlic that can easily go unrecognized. Usually, growers notice a general yellowing of their garlic plants with the tips of leaves often turning brown (Fig. 1). If you examine the bulb, it can have feeding marks on the outside of the skin (Fig. 2) or the basal plate can separate easily from the bulb (Fig. 3). The best way to determine whether these mites are present is to carefully dissect the region where the roots and bulb come together. There are usually other mites present, but with a hand lens the bulb mites usually can be identified from other mites. The mite is bulb shaped with its legs moved forward and a bulbous rear end (Fig. 4). The mouthparts and legs are purplish-brown while the main body is creamy white. The mites are extremely small (from 0.02 to 0.04 inches) and are usually very slow moving. They are usually found in clusters underneath scales and at the base of the roots.

Early in the growing season, bulb mites can cause poor plant stands and stunted growth as they feed on the plants. Infested plants easily can be pulled out of the soil because of the poor root growth. This feeding also opens the bulb up to possibly greater infection from the white rot fungus *Stromatinia cepivorum*. Later in the season, greater than normal amounts of *Botrytis* or soft rot or *Fusarium* dry rot may be seen because of the wounds caused by these mites.

Figure 1. Garlic plants with early signs of root/bulb problems

Figure 2. Garlic bulb with feeding damage from bulb mites

Figure 3. Roots separate easily from garlic bulb

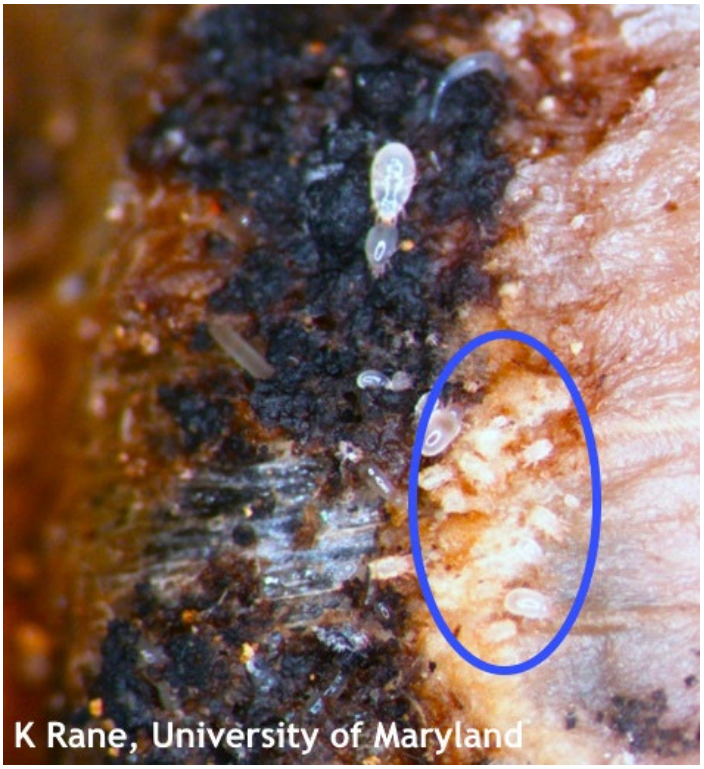


Figure 4. Bulb mites (very young ones in circle)

In some situations, garlic became infested with bulb mites that was grown in fields that never had any Allium species in it (usually it is new bulbs in an infested field). But bulbs were saved from the previous year's garlic harvest and used in the new soil and some of them were infested with the mites. **Be sure to start with clean fields and clean bulbs as there is little chemically that can be done for control.** If you find you have bulb mites in your harvested bulbs that you intend to use next year you can hot water treat the garlic seed but this will decrease germination. Put the seed in water heated to 130˚F 10-20 minutes or you can soak the seed for 24 hours in a 2% soap (don't use detergent) and 2% mineral oil solution before planting. In the field you should rotate out of any Allium crops for at least four years and you would need to control any wild Allium species in that field. Rotation out of Allium crops is helpful but because the mites can survive on the residue of many crops it will be difficult to eliminate them completely.

White Rot of Onion and Garlic

– *Jerry Brust, IPM Vegetable Specialist, University of Maryland*; jbrust@umd.edu and *Karen Rane, Plant Diagnostician, University of Maryland* rane@umd.edu

One very serious soil disease that affects Allium species, especially onion and garlic, is white rot, caused by the fungus *Stromatinia cepivorum* (syn. *Sclerotium cepivorum* (Fig. 1)), which was found in the last few weeks in Maryland. White rot is NOT the same as white mold, which is caused by *Sclerotinia sclerotiorum,* which has a very large host range (tomatoes, peppers and 170 other plant species); white rot only infects *Allium* species.

Leaves of Allium plants with white rot exhibit yellowing, dieback, and wilting. Under ideal weather conditions, white mycelial growth can develop on the bulb. As the disease progresses, the mycelium becomes more compacted with numerous small, spherical black bodies (sclerotia) forming on this white mat (Fig. 2). These sclerotia are the overwintering structures of the pathogen and are approximately the size of a pin head. As the disease progresses, these sclerotia are eventually released into the soil. Infected plant roots will rot, making the plant easily pulled from the soil. Disease development is favored by cool, moist soil conditions. The soil temperature range for infection is 50˚-75˚F, with an optimum of 60˚-65˚F. At soil temperatures above 78˚F, the disease is greatly inhibited. Soil moisture conditions that are

favorable for onion and garlic growth are also best for white rot development.

Figure 1. White rot on garlic plant

Figure 2. Sclerotia of white rot fungus on garlic

An increase of white rot in a field that has had several Allium crops may go unnoticed for a time as sclerotia numbers increase and disperse. One sclerotium per 20 pounds of soil will cause disease and results in measurable crop loss. The sclerotia will lay dormant until root exudates, exclusively from an Allium species, stimulate germination. Root exudates from non-Allium species will not stimulate the germination of white rot sclerotia. Cool weather is needed for both sclerotia germination and mycelia growth. Mycelia will grow through the soil until they encounter an *Allium* root at which time the fungus initiates infection. Mycelia can grow from one plant to a nearby plant, allowing the pathogen to move between plants.

Management of white rot should focus on disease avoidance by not introducing the pathogen into a field. Sclerotia can spread throughout a field, or from field to field, through the movement of soil, equipment, or plant material (especially garlic cloves). Sanitation is important to prevent sclerotia from moving from an infested field to a clean field. Plant only clean stock from known origins that has no history of white rot. Always clean soil off of equipment and sanitize with quaternary ammonia before moving to another field. The Allium crops from an infested field should not be used as seed. Rotation alone will not control white rot because sclerotia can survive in the soil for 20-40 years. If the disease is found, reducing or eliminating irrigation will

reduce the damage to the current crop but will not stop the spread of the disease.

Because the fungus is vulnerable to temperatures above 115°F, dipping seed garlic in hot water is a possible preventive measure that will reduce the amount of pathogen but will not completely eliminate it. Temperature control is important when using this method because temperatures above 120°F may kill the garlic. There are other cultural and organic practices (i.e., biofumigation and solarization) that a grower might try to fight this disease and these can be found at: https://rvpadmin.cce.cornell.edu/uploads/doc_479.pdf

Chemical applications can be made for white rot management and include, for onion, tebuconazole applied in a 4-6 inch band over or into the furrow at planting or via chemigation. For garlic an in-furrow at-planting application using iprodione or tebuconazole or fludioxonil can reduce disease incidence, however there are crop rotation restrictions with the use of these chemicals so be sure to check the Mid-Atlantic Commercial Production Recommendations guide for more details.

One other note is that the presence of bulb mites can exacerbate disease problems by opening the bulb up to infection from white rot and growers also will need to manage these mites.

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

Spinach crown mites *Rhizoglyphus sp.* feed within the folds of new leaves in the crown of spinach plants. This feeding causes the new leaves to become deformed as they grow (Figs.1 and 2). Crown mite adults are extremely small bulbous nearly transparent mites that also may have a yellow-beige body color with reddish-brown legs (Fig. 3). A good characteristic to look for to identify these mites is the sparse long hairs mostly found on the back end of the mite (Fig. 3). Crown mite eggs are spherical and clear and laid on the creased leaf surfaces in the crown area. Some reports state that crown mites can act as vectors for plant pathogens such as Pythium and Rhizoctonia, but this is not definitive.

The spinach crown mite is most damaging in soils high in organic matter and under cool moist conditions (weather conditions we have had this past week). Because these mites can consume organic matter they can survive in soils after the crop has been removed. This is one reason they are difficult to control as they can survive for fairly long periods of time with no crop being present. The other reason they are difficult to 'control' is we do not realize they are causing the problem until it is too late.

Most control recommendations include sanitation and crop rotations as being important, as are fallow periods. Pyrethroids are a possible chemical control as is Neem; any chemical control has to get down into the crown of the plant to have any chance of working. There has been little research conducted on the most efficacious material for these mites. Mostly what is needed are warm sunny days where spinach can grow well and the environment is not so conducive to the mites.

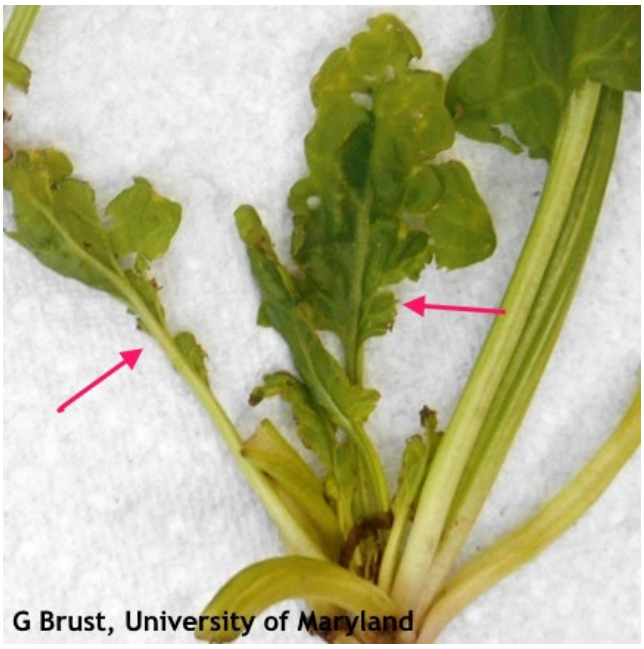


Figure 1. Crown leaves fed on by spinach crown mites are misshapen and ragged with necrotic margins as they expand.

Figure 2. Crown leaves with distorted and wrinkled appearance cause by spinach crown mite feeding.

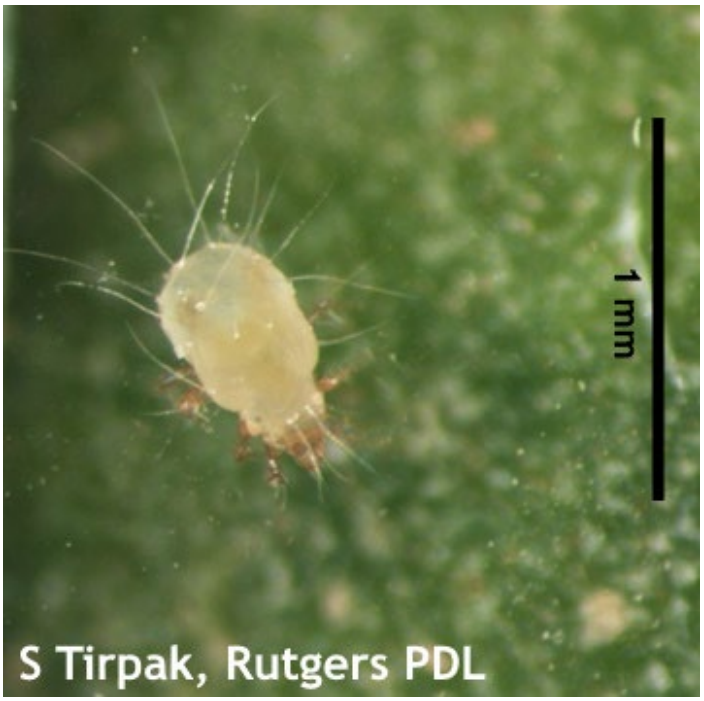


Figure 3. Spinach crown mite adult with sparse long hairs over its body

Fruit Crops

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

Northern highbush blueberry bushes can produce berries even when there is no or limited pollen movement by bees. Some of the flowers can turn into berries, even if there are poor pollination conditions or low bee activity during bloom. However, often these berries will be small, slow to ripen, and may drop off early. For maximum potential yield, it is important that the flowers are visited by bees during bloom to transfer sufficient pollen while the flower is still viable so that fertilization can occur, leading to seed set, berry expansion, and larger berries.

In addition, some varieties benefit from cross pollination. Fields should be planted with a combination of varieties that bloom around the same time and that are compatible. For cultivars dependent on having cross-pollination for full yields, this can provide a 10-20% increase in yield from the improved fruit set and berry size.

Flowers of blueberries are generally less attractive to honeybees than other flowers due to the relatively low nectar. Because of this, move bees into blueberry fields after 5% bloom but before 25% percent of full bloom to avoid movement to more preferred flowering plants. Placement near to the blueberry field can also help to keep them focused on the crop.

Research has shown variation across northern highbush cultivars in their needs for bee pollination due to the relative attractiveness of different cultivars and their degree of self-compatibility. Experience shows that a minimum of 2 hives per acre are needed. In some cases, 5 hives per acre are recommended (such as for Jersey and Earliblue). Some growers are using up to 8 colonies per acre to ensure good pollination if spring weather is cool and there are only a few good days for honeybee activity. A rule of thumb is that you'll need 4 to 8 honeybees per bush in the warmest part of the day during bloom to get blueberries pollinated.

Honeybee pollinating a blueberry flower.

Bumblebees are very efficient at pollinating blueberry, with activity at lower temperatures than honeybees, faster visits to flowers, and higher rates of pollen transfer per flower visit. A single visit of a bumble bee to a blueberry flower can deposit sufficient pollen to get full pollination, whereas three visits are needed by honeybees.

Blueberry information was adapted from https://bee-health.extension.org/pollinating-highbush-blueberries/

Agronomic Crops

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

Early Season Moth Activity

Many thanks to Haley Sater with UMD Cooperative Extension and Joanne Whalen, extension entomologist emeritus extraordinaire for assistance with checking traps. Moth counts were fairly low this week, possibly as a result of cooler night temperatures.

Location	# of Nights	Total Catch	
		TAW	BCW
Salisbury, MD	7	2	1
Seaford, DE	7	0	0
Sudlersville, MD	7	0	8
Harrington, DE	7	64	8
Smyrna, DE	7	138	55
Middletown, DE	7	6	--

Corn

Early season insect pest injury is beginning to reveal itself. This week there were reports of cutworm and seedcorn maggot, and wireworm/white grub damage will also be evident. With cool weather and rain, we are entering a period of higher risk for slug damage. Young corn is at the greatest risk for heavy feeding damage. If the plants and the stand appear to be going 'backwards', multiple slugs are present under residue near the plants, and the forecast indicates cool weather which reduces crop growth, a treatment might be advised. Deadline MPs at 10 pounds per acre has given us great slug reduction in previous experiments. Ferroxx AQ is an iron phosphate bait that is safer for vertebrates and can be as effective as Deadline. It has a label rate of 4-25 pounds per acre. Slug baits work best if a couple of days of dry weather occur after application.

A report came in this week of cutworm activity in field corn. There are a couple of different groups of cutworm. Some species like Dingy and Clay Backed overwinter as larvae and can be present at planting. The field we visited had large caterpillars, large open circular tunnels, and, most importantly, corn that was not quite yet at V2. These plants will recover from cutworm feeding. Large cutworms are difficult to kill and these cutworms were about ready to cycle out of the field. On the other hand, Black cutworm moths are laying eggs now, and are attracted to weedy fields. Our first significant flight occurred about 3 weeks ago as indicated by our Smyrna and Middletown pheromone traps. By the end of next week, the first black cutworms should be large enough to cut plants. Pay attention to weedy fields and fields that had cover crop terminated late, close to or even after planting. Black cutworm hides during the day in tunnels and will cut plants and drag the

cut plant into its burrow to feed. If a field is above threshold and cutworms are present, a pyrethroid application is recommended.

Seedcorn maggot damage can be a bit more subtle, resulting in withered plants or, more often, stunted plants. Wireworm damage will appear either as withered plants with a small hole underground or plants with yellow streaks. There are no rescue treatments for either.

Last year, we made a short video showing some of the early season pest damage on corn. You can check it out at https://www.youtube.com/watch?v=D4wJwUEmlEI.

Soybean
Pay urgent attention to emerging soybean planted in no-till, high residue fields or fields with high cover crop biomass for slug damage this week. We have seen a sizeable increase in gray garden slug activity this week in New Castle County in fields that had low counts. Thresholds for soybean have never been worked out, and soybean can tolerate considerable stand damage without compromising on yield, or at least enough to offset the cost of a rescue treatment. Rescue treatments for soybean probably should be made before the crop emerges out of the ground. Often times, most if not all of the seed has emerged by the time such an application is made, by this time, slug damage has been done.

Cultural strategies include closing seed slots, row cleaners, and turbo tillage. Pop up fertilizer may help in corn. Ammonia and possibly liquid potash might be used to burn slugs if applied on a warm, humid, still night so that the material comes into direct contact with the slugs. Otherwise, they are unlikely to have significant or lasting effect.

Small Grain
Several calls have come in over the last couple of weeks regarding barley yellow dwarf. There has been more BYDV this year than there has been since the early to mid-2010s. Fields with even low aphid populations in the fall exhibit symptoms. It is possible that some of our stunted plants were infected with the February aphid population increase. Some wheat varieties have some degree of BYDV tolerance, check with your seed salesmen or company agronomist. Seed treatments are an option and should provide between 4 and 9 weeks of aphid control. I reckon a seed treatment would probably cost between 10-15 dollars. Endigo is labeled for barley and should give the longest residual control and may cost a bit less. Sivanto is labeled for both barley and wheat but is a very expensive product. Pyrethroids and OPs are labeled and do a good job killing aphids but have very limited residual activity.

There is an excellent publication detailing what is known about BYDV and observations from multiple states, including proposed thresholds for managing for BYDV, the impact of planting date, and ideal treatment windows. You can find it here: https://entomology.ca.uky.edu/files/efpdf1/ef150.pdf.

Continue scouting for armyworm activity, especially in Kent and New Castle counties. Larvae may be present on plants early in the morning, but they tend to hide underneath residue during the day. Armyworm are susceptible to pyrethroids.

Small Grains Fusarium Head Blight Updates

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

We finally received some much-needed rain with a lot more in the forecast. While Fusarium Head Blight (FHB) is favored by wet conditions, the dry spring we have had up until now should have kept spores from ramping up in April and we remain at a low risk in the FHB model (Figure 1). I do anticipate that by next week our risk will be a bit more elevated. Most barley is wrapping up heading and will hopefully be in the clear. Over the past few days wheat heads have started to become visible. Depending on the weather, we can usually expect flowers to start showing up on wheat heads 3-5 days after full head emergence. We did have a few cool nights this week that can stretch this process out to 7-10 days. If you are planning a wheat fungicide application, scout frequently and apply when at least 50% of the wheat heads are flowering to 4-6 days after flowering. You will be looking for bright yellow anthers in the center of the wheat

head to signal the start of flowering (Figure 2). Anthers can remain attached after flowering but become pale white. Additional details on fungicide application can be found in the April 7 article. Data over the past few seasons has shown that it is better to be a little bit after first flowering than to spray too soon, particularly for deoxynivalenol (DON). If you spray too early, heads that have not emerged (secondary tillers) will not be protected by the fungicide application. Although rains have a way of showing up right at peak time for FHB, temperatures will remain a bit below optimum for *Fusarium*. The rain and temperatures should allow for good grain fill and we will continue to keep a close eye on FHB risk.

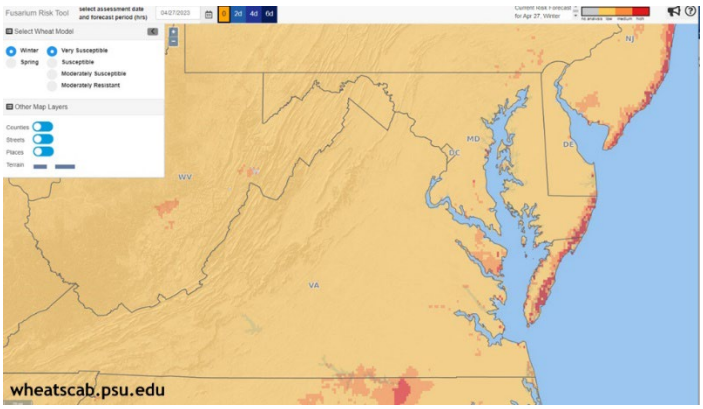


Figure 1. FHB Risk Model for April 27, 2023

Figure 2. From left to right Feekes 10.3, Anthesis, Feekes 10.5.1 (yellow anthers beginning flowering), 4 days after anthesis (white anthers post flowering).

Monthly Grain Market Outlook

– *Nate Bruce, Farm Business Management Specialist,* nsbruce@udel.edu

Written 4/27/2023

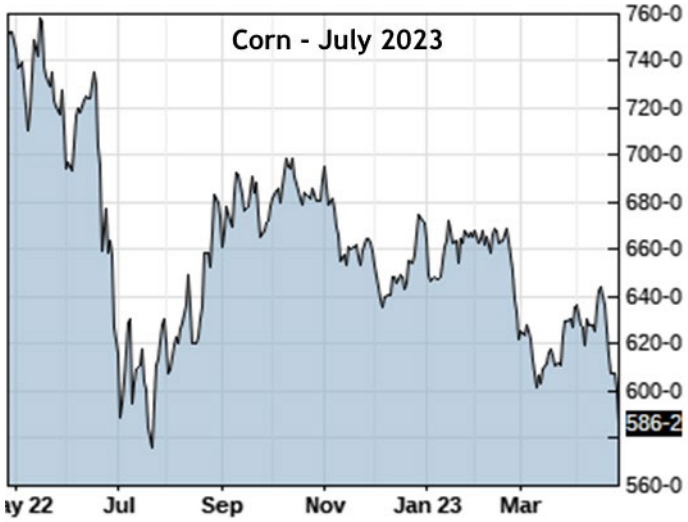
Corn prices have been in steady retreat the past few months. The weather forecast in the corn belt is favorable for planting in late April and May. Unless, a major weather problem occurs, corn prices are in retreat and can possibly be heading that way all the way into June. Soybeans are in a bearish market as well. Soybean prices tried to rally this month but came up short. At this point, the only thing that can change the direction of soybean prices are planting delays. Uncertainty exists around large wheat supplies in Russia. Wheat prices are remaining volatile with uncertainty surrounding the Black Sea Grain Initiative.

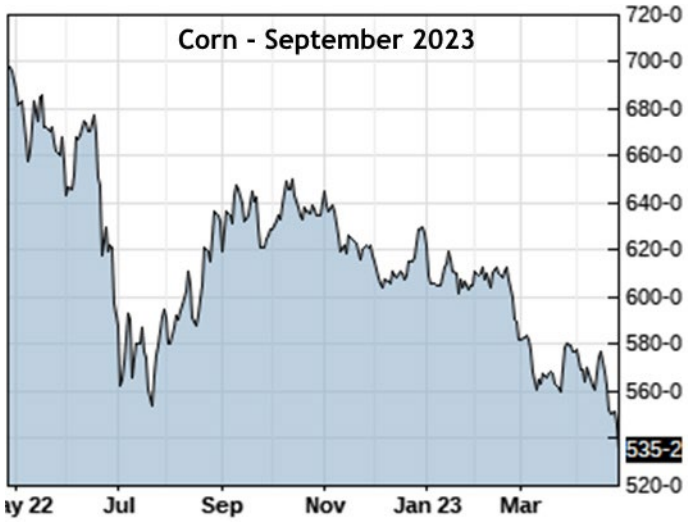
The April USDA World Agriculture Supply and Demand Estimates Report (WASDE) estimated corn ending stocks remaining the same as the March estimate of 1,342 million bushels. The USDA WASDE report estimated reduced imports, exports, and industrial use compared to the March estimate. The USDA WASDE also projected the ending stocks for soybeans remaining the same as the March estimate at 210 million bushels. The estimate had no changes in soybean demand from the March estimate. Wheat ending stocks were projected at 598 million bushels, up by 5.28% from the March estimate of 568 million bushels. The USDA WASDE estimated increased imports and supply but reduced demand for wheat feed, domestic use, and export use.

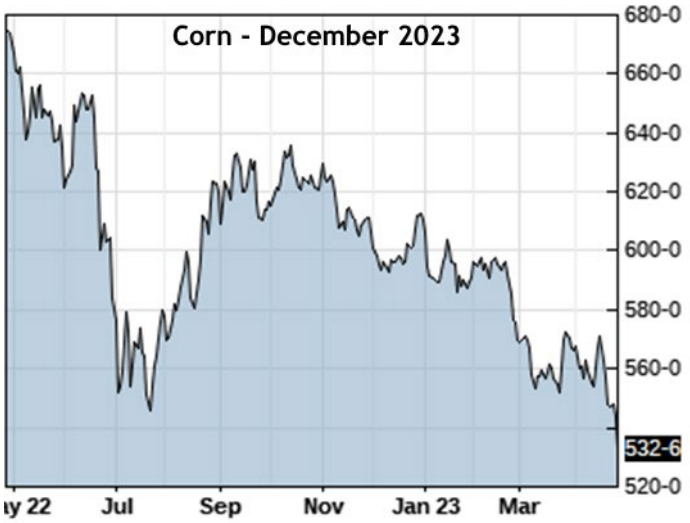
In international grain market news, the Russian Foreign Minister threatened this week to abandon the Black Sea Grain Initiative. The Black Sea Grain Initiative is the agreement in place that allows for safe travel of agricultural exports from Ukrainian ports. To date, 29 million metric tons of agricultural products have departed Ukraine under the deal aboard over 900 cargo vessels. Prior to the Russia / Ukrainian conflict, both countries combined accounted for one quarter of global grain exports. Brazil is currently on track for a record-breaking soybean harvest this marketing year. Brazil is estimated to have an increase in soybean production of 20% from year on year. This estimate is about 152

million tons of soybeans produced this marketing year. This could lead to an oversupply of soybeans. China cancelled purchasing 327,000 tons of US corn, sending market prices tumbling. Chinese grain purchase cancellations highlight lingering concerns about massive Brazilian harvests causing weak export demand for US grain. In addition, China has recently set a goal to produce 90% of grain the county needs by 2023 to ensure greater food security and to reduce imports because of the Ukrainian war and geopolitical issues.

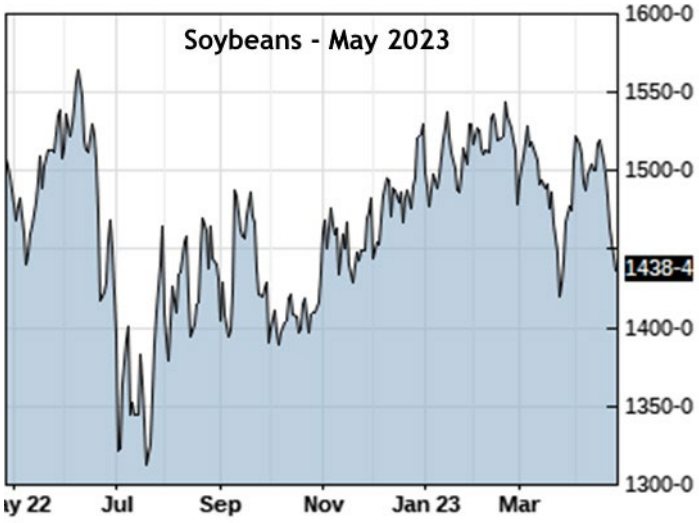
Corn Futures

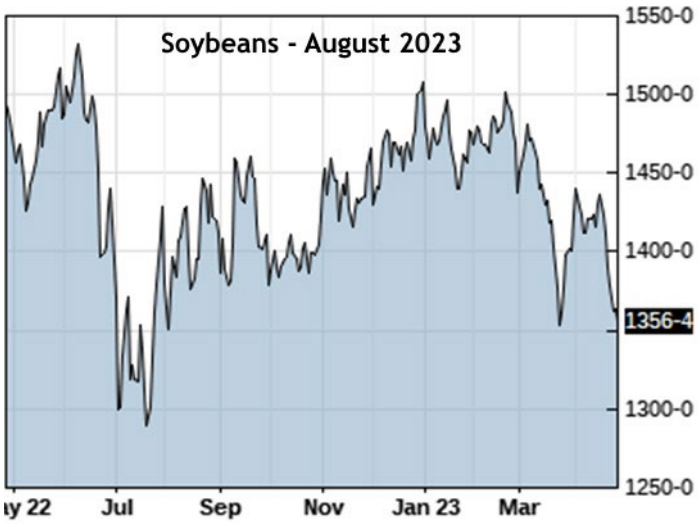


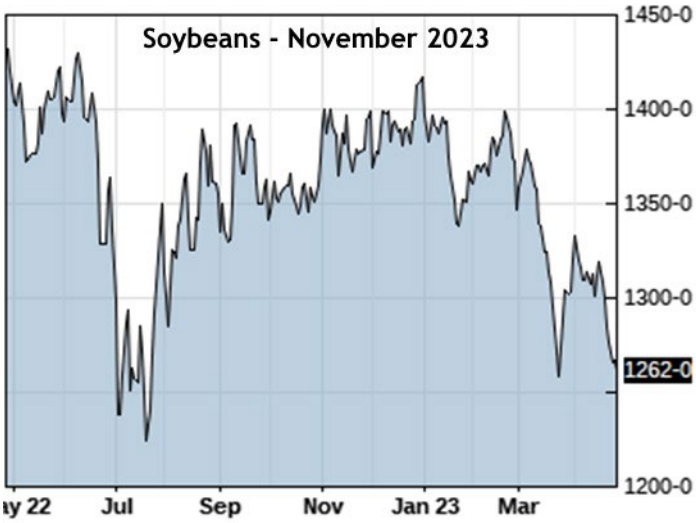


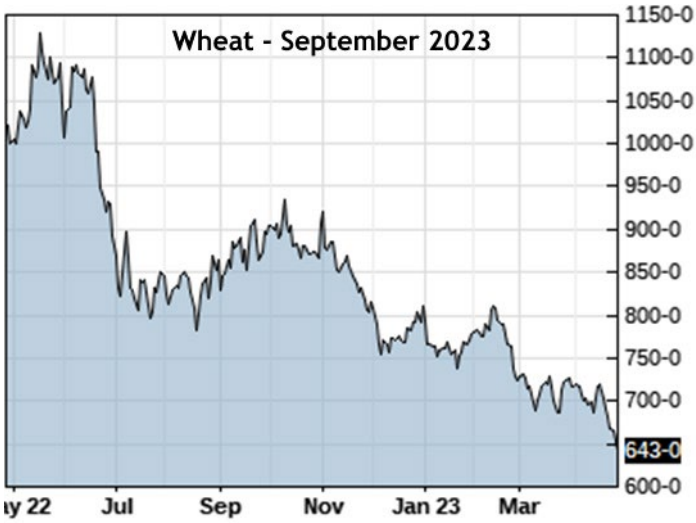


Soybean Futures

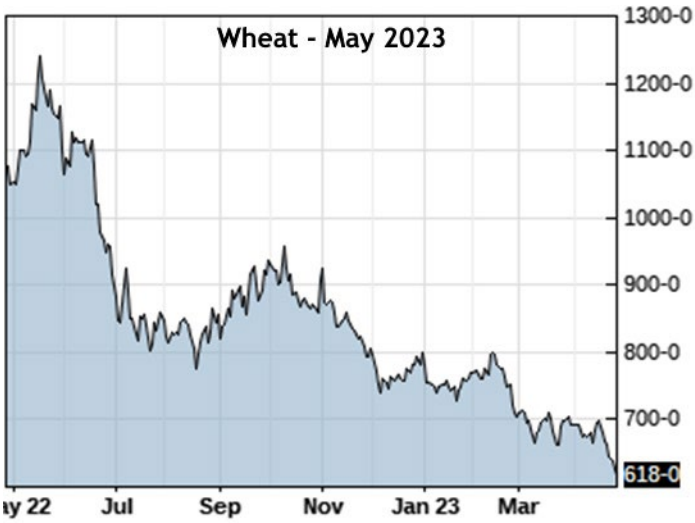


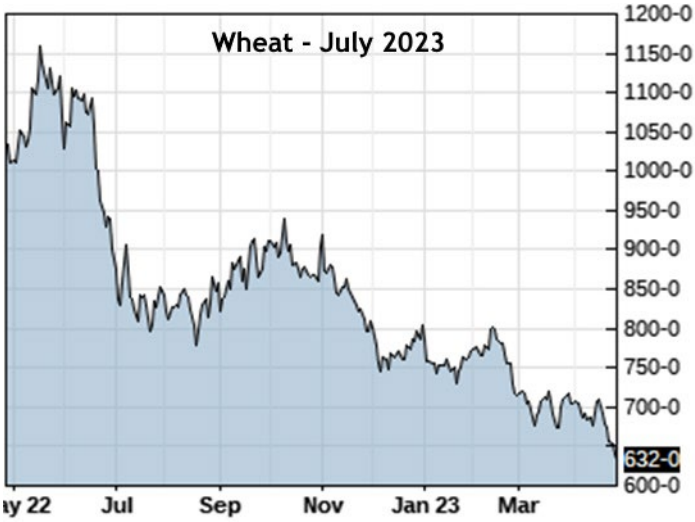






Wheat Futures





General

Guess the Pest! April 21 Answer: Honey Bee Swarm- *David Owens, Extension Entomologist,* owensd@udel.edu

Congratulations to Emmalea Ernest for correctly identifying the brown mass as a honeybee swarm. April – June is prime swarm season. Most swarms are very docile and gentle and shouldn't bother you. If you see one, it is important to contact a local beekeeper to collect the swarm so that the swarm will not move into an undesirable location like a wall void in a building. Not only that, but 80% of swarms do not survive their first year, unless a beekeeper watches after them. The Delaware Beekeepers Association maintains a contact list should you encounter a swarm: https://delawarebeekeepers.com/Swarm-Removal.

Guess the Pest! April 28 – *David Owens, Extension Entomologist*, owensd@udel.edu

It is time to test your observational skills once again. Earlier this week, some nefarious agent took a shining to these young corn plants. All that was left in the photo were plants lying on the ground and some enormous boot prints. Who did it? Click on the link http://www.udel.edu/008255 or the Guess The Pest Logo to log your answer!

Announcements

2023 Chrysanthemum Seminar

Tuesday May 9, 2023 2:00-5:00 p.m.
Delaware Department of Agriculture
2320 S. DuPont Hwy
Dover, DE 19901

This first time workshop is a great opportunity for new and established growers of chrysanthemums.

Agenda

2:00 – 2:10
Welcome and DE Department of Ag Regulations, Inspections, Licensing
Jeff Brothers, DE Department of Ag

2:10 – 3:00
Mum Production Practices
Nick Flax, Ball Seed Company
Producing high-quality garden mums boils down to a few key factors: healthy inputs, appropriate crop scheduling, and diligent management of crop culture to combat in-season challenges. This presentation will cover start-to-finish production considerations, including: input selection, growing-media concerns, pinching, watering and fertility management, natural-season vs. black-cloth production, and benchmarking your mums' progress using a start-to-finish growth management approach.

3:00 – 3:50
Chrysanthemum diseases and disease management
Jill Pollok and Morgan Oliver, University of Delaware
Common chrysanthemum diseases we see in the UD Plant Diagnostic Clinic, which diseases to be on the lookout for, and how to prevent and manage chrysanthemum diseases.

4:00 – 4:50
Chrysanthemum pests and integrated pest management
Brian Kunkel, University of Delaware
Common chrysanthemum pests and integrated pest management practices for mum production.

Cost is $15 (pay at the door with cash or check)

2 pesticide credits to DE for 03 Ornamental & Turf
2 pesticide credits to PA for core or private applicators

Register Online *or call (302) 698-4500*

DE & MD Corn Growers Invited to Participate in On-Farm Trials

Maryland Grain Producers and Utilization Board is funding three different on-farm research trials for the 2023 season:

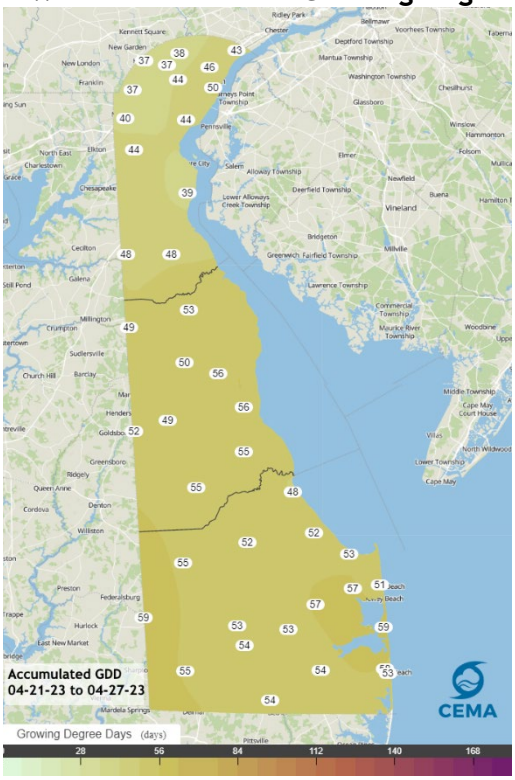
1. Corn response to sidedress N rates
2. Biological product evaluation
3. Corn response to potassium

Delaware growers are invited and encouraged to participate. If you would like to participate in one of these trials, please contact Dr. Nicole Fiorellino at 443-446-4275 or at nfiorell@umd.edu.

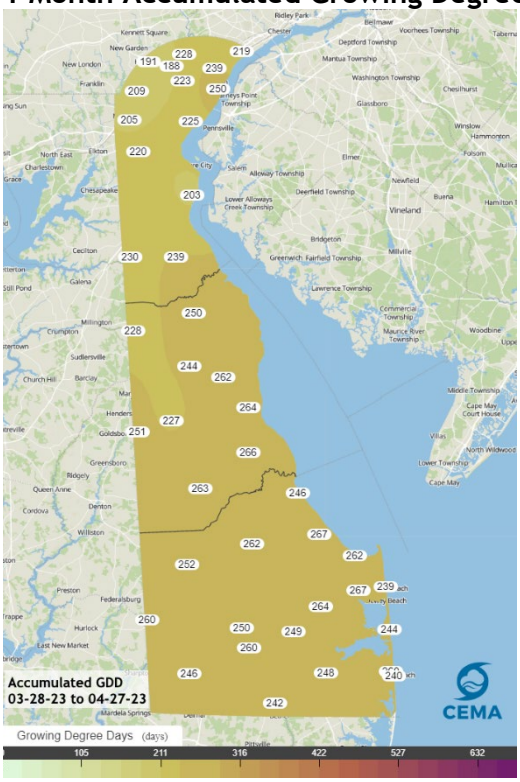
Learn more on the MGPUB website - http://marylandgrain.org/.../on-farm-research-real-time.../

Weather Summary

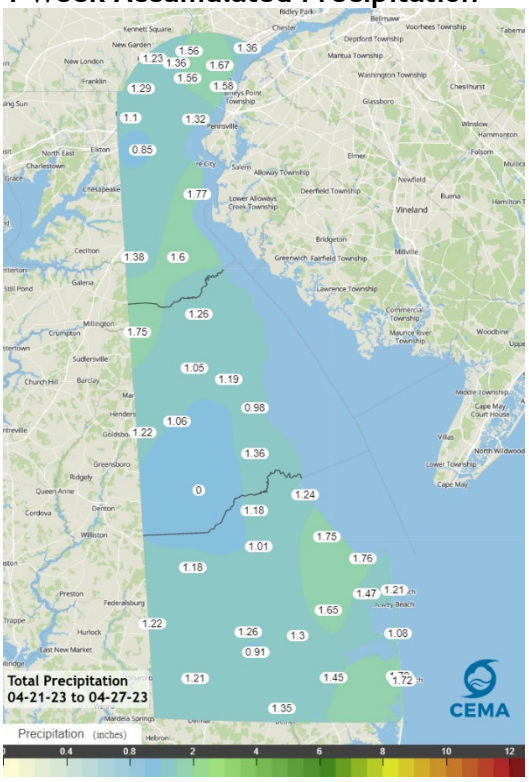
1 Week Accumulated Growing Degree Days



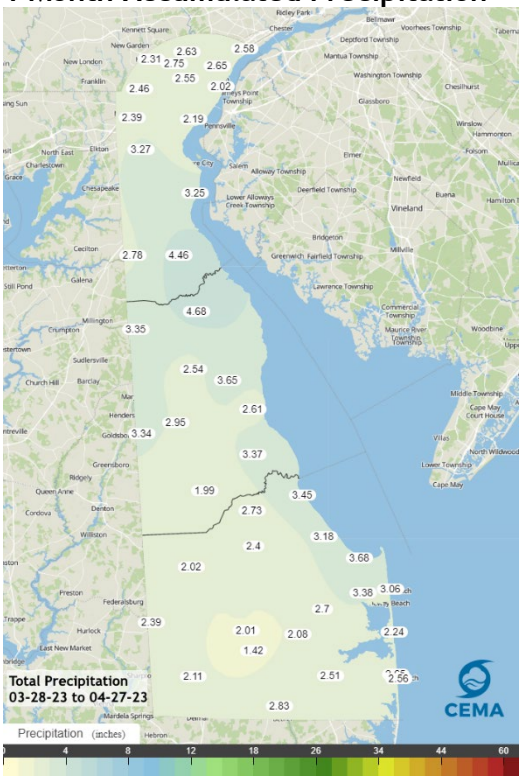
1 Month Accumulated Growing Degree Days



1 Week Accumulated Precipitation



1 Month Accumulated Precipitation



These weather maps are generated from DEOS weather station data and are part of a new Ag Weather website that is under development. Your feedback is welcome!

Weekly Crop Update is compiled and edited by Emmalea Ernest, Scientist – Vegetable Crops and Drew Harris – Kent Co. Ag Agent