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
Beetles, squash bugs and spider mites are all active in various cucurbit crops. Cucumber beetles for the most part should be winding down until mid-July. However, care still needs to be exercised in bacterial wilt susceptible crops such as cantaloupes and cucumbers. If treating beetles with a drip application, pay special attention to label guidance on the appropriate amount of product per 1000 ft. of drip tape. This is NOT the same as a banded application to which only the protected area is used for calculating rates. Chemigating insecticides necessitates using the planted area, not the bed or plastic area to determine rates. Using bed area rates may result in a significant under application!

Squash bugs are beginning to lay eggs in fields. Consider a treatment in 1 egg mass per plant is reached AND those eggs recently or are hatching. Squash bugs are susceptible to many of the same products as cucumber beetles.

Spider mites are now detectible in most watermelon fields. So far, our scouting efforts have primarily found mites along field edges. For mites, it seems to be more of a question of when to treat rather than if. When treating, use high water rates and small droplet sizes. The key is to obtain good coverage, especially under leaves. Agri-Mek and Zeal have translaminar activity while Banter, Portal, and Oberon do not. To my knowledge, there hasn't been any research done to determine whether or not it is better to use a miticide targeting adults or mobiles first or a miticide targeting eggs and small juveniles first. Pay attention to label guidance on bee toxicity. Labels will state that a product should not be applied to areas where bees are actively foraging or to areas where bees are foraging. The key is the word 'active'. Such labels advise that applications be made late in the day.

Tomatoes
Scout for fruit worm damage. Earworms began flying about 2 weeks ago, though fortunately at lower levels and with apparent high moth pyrethroid susceptibility. If a worm treatment is necessary, account for other pests present such as spider mites and sink bugs. Mites can be flared, especially following stink bug applications. Thresholds are 2 mites per upper canopy leaflet. The other pest group to scout for are stink bugs. Their damage appears as white starburst type feeding scars on the fruit surface. Besides bifenthrin, foliar application of neonicotinoid insecticides can help speed mites up while pyrethroids take out all the insects feeding on mites.

Sweet Corn
Corn earworm counts are similar to slightly higher than last week. Moth susceptibility in bioassays remains high. Most parts of the state can probably get by with a 4-day spray schedule, especially following a Besiege or Elevest application. As a reminder, UD action thresholds are more conservative than neighboring states. Thursday moth trap counts are as follows:

Trap Location	BLT – CEW	Pheromone CEW
	3 nights total catch	
Dover	2	29
Harrington	0	51
Milford	0	43
Rising Sun	3	61
Wyoming	0	10
Bridgeville	0	37
Concord	0	56
Georgetown	0	31
Greenwood	2	46
Laurel	1	14
Seaford	1	9
Lewes	---	39

Correcting Nutrient Deficiencies in Vegetable Crops

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

As the season progresses, growers and consultants will use tissue tests to determine the nutrient status of vegetable crops and take corrective actions if necessary. As a rule, if levels are in the adequate range or are high no corrective action is needed. If levels have dropped to near deficient levels or are in the deficient category then additional mineral nutrients will need to be added. Critical tissue test values for many vegetables can be found in the Mid-Atlantic Commercial Vegetable Recommendations. The following are some guidelines for correcting low or deficient levels from tissue tests in vegetables.

Nitrogen
If tissue results are low or deficient for Nitrogen (N) apply additional nitrogen as a sidedressing or through fertigation:

Watermelon, muskmelons, mixed melons: 40 lbs/a N
Cucumbers, squash: 20 lbs/a N
Tomatoes, peppers: 40-60 lbs/a N
Eggplant: 30 lbs/a N
White potato: 40 lbs/a N before tubers start to size
Cole crops, greens: 30-40 lbs/a N
Sweet corn: 40-80 lbs/a N
Beans: 20 lbs/a N

Additional nitrogen may be needed for extended harvest in some crops such as watermelons. Use non-acidic forms of nitrogen for blossom end rot sensitive vegetables such as tomato or pepper (calcium or potassium nitrate is recommended).

Foliar applications of 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 N in sufficient water to have less than 2% salt solution. Multiple applications will be necessary to correct deficiencies, or combine with a soil application.

Potassium
If tissue test results are low or deficient for potassium (K) apply additional K as a sidedressing or through fertigation. Note that fruiting vegetables often have low K levels in tissue tests if fruit loads are heavy and first harvest often brings them back in balance.

Watermelon, muskmelons, mixed melons: 40 lbs/a K
Cucumbers, squash: 20 lbs/a K
Tomatoes, peppers: 40-80 lbs/a K
Eggplant: 40 lbs/a K
White potato: 40 lbs/a K
Cole crops, greens: 30-40 lbs/a K
Sweet corn: 40-80 lbs/a K
Beans: 40-80 lbs/a K

Foliar sprays of potassium nitrate or sulfate (4 lbs/a K foliar) may be useful on tomatoes and melons.

Phosphorus
If tissue test results are low or deficient for Phosphorus (P), apply an additional 20-40 lbs/a P for all crops as a sidedressing or through fertigation. Note that areas with high levels of calcium or magnesium in irrigation water can have problem with P precipitates clogging drip irrigation emitters and water may need to be acidified to prevent this.

Magnesium
If tissue test results are low or deficient for magnesium (Mg) apply 15-25 lbs of Mg as a sidedressing or through fertigation. Another option is to apply 2-3 applications foliarly (2-4 lb

Mg/A) for sensitive crops such as tomatoes or melons.

Calcium
For vegetable crops low or deficient in calcium (Ca), foliar applications of 2-4 lb Ca/A. Calcium chloride at the rate of 5-10 lb per 100 gallons per acre or calcium nitrate at the rate of 10-15 lb per 100 gallons per acre is recommended for fruiting vegetables (tomatoes, peppers, eggplant). Calcium chelates are also available. For potatoes, sidedress gypsum (calcium sulfate) at a rate of 500 lbs/a.

Sulfur
For vegetables low or deficient in sulfur (S) apply 20-30 lbs/A S as a sidedressing or through fertigation.

Ammonium sulfate and ammonium thiosulfate are effective ways to add both N and S at the same time. Gypsum is an inexpensive material to use to provide S.

Micronutrients
For micronutrient metals (Iron – Fe, Manganese – Mn, Zinc – Zn) foliar application is often the most effective way to correct low or deficient levels. Suggested rates are: Fe, Mn, 1-2 lbs/a, and Zn ¼ lb/a.

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. Do not use boron on bean crops.

Sunburn in Vegetables – Use of Particle Films

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

Recent weather has produced conditions where there is high potential for sunburn in fruits and fruiting vegetables. Growers may need to consider ways to protect against sunburn. Sunburn is most prevalent on days with high temperatures, clear skies and high light radiation. We commonly see sunburn in watermelons, tomatoes, peppers, eggplants, cucumbers, apples, strawberries, and brambles (raspberries and blackberries).

There are three types of sunburn which may have effects on the fruits. The first, sunburn necrosis, is where skin, peel, or fruit tissue dies on the sun exposed side of the fruit (Figure 1). Cell membrane integrity is lost in this type of sunburn and cells start leaking their contents. The critical fruit tissue temperature for sunburn necrosis varies with type of fruit. Research has shown that the fruit skin temperature threshold for sunburn necrosis is 100 to 104°F for cucumbers; 105 to 108°F for peppers, and 125 to 127°F for apples. Fruits with sunburn necrosis are not marketable. Injury may be white to brown in color.

Figure 1. Sunburn necrosis on pepper fruit.

The second type of sunburn injury is sunburn browning. This sunburn does not cause tissue death but does cause loss of pigmentation resulting in a yellow, bronze, or brown spot on the sun exposed side of the fruit. Cells remain alive, cell membranes retain their integrity, cells do not leak, but pigments such as chlorophyll, carotenes, and xanthophylls are denatured or destroyed. This type of sunburn browning occurs at a temperature about 5°F lower than sunburn necrosis (i.e. 115 to 120°F in apples). Light is required for sunburn browning. Fruits may be marketable but will be a lower grade.

The third type of sunburn is photooxidative sunburn (Figure 2). This is where shaded fruit are suddenly exposed to sunlight as might occur with late pruning, after storms where leaf cover is suddenly lost, or when vines are turned in drive rows. In this type of sunburn, the fruits will become photobleached by the excess light because the fruit is not acclimatized to high light levels, and fruit tissue will die. This bleaching will occur at much lower fruit temperatures than the other types of sunburn. Damaged tissue is often white in color.

Figure 2. Photooxidative sunburn on pepper fruit.

Sunburn increases when storms cause canopies in vine crops to be more open, exposing fruits to a high risk of both sunburn necrosis and photooxidative sunburn.

Genetics also play a role in sunburn and some varieties are more susceptible to sunburn. Varieties with darker colored fruit, those with more open canopies, and those with more open fruit clusters have higher risk of sunburn. Some varieties have other genetic properties that predispose them to sunburn, for example, some blackberries are more susceptible to fruit damage from UV light.

Storms that cause canopies in vine crops to be more open will expose fruits to a high risk of both sunburn necrosis and photooxidative sunburn.

Genetics also play a role in sunburn and some varieties are more susceptible to sunburn. Varieties with darker colored fruit, those with more open canopies, and those with more open fruit clusters have higher risk of sunburn.

Control of sunburn in fruits starts with developing good leaf cover in the canopy to shade the fruit. Fruits most susceptible to sunburn will be those that are most exposed, especially those that are not shaded in the afternoon. Anything that reduces canopy cover will increase sunburn, such as foliar diseases, wilting due to inadequate irrigation, and excessive or late pruning. Physiological leaf roll, common in some crops such as tomato, can also increase sunburn.

In crops with large percentages of exposed fruits at risk of sunburn, fruits can be protected by artificial shading using shade cloth (10-30% shade). However, this is not practical for large acreages.

Particle Films

For sunburn protection at a field scale, use of film spray-on materials can reduce or eliminate sunburn (Fig. 3). These materials are kaolin clay based, calcium carbonate (lime) based, or talc based and leave a white particle film on the fruit (such as Surround, Screen Duo, Purshade and many others). There are also film products that protect fruits from sunburn but do not leave a white residue, such as Raynox. Apply these materials at the manufacturer's rates for sunburn protection. They may have to be reapplied after heavy rains or multiple overhead irrigation events.

Figure 3. Purshade treated pepper. Note the sunburn on the side with lower coverage.

Particle films also have been used to reduce heat stress related disorders in fruits and vegetables. While particle films have gained use in tree fruits, their usefulness in vegetables is still unclear. Research in a number of states has shown reduced fruit disorders such as sunburn in peppers and white tissue in tomatoes when applied over those crops. Watermelon growers have used clay and lime based products for many years to reduce sunburn in that crop in southern states. Research at the University of Delaware in 2018 showed improved tomato interior quality with some particle film products. Past work on watermelons has shown limited usefulness for overall stress avoidance.

There are some drawbacks to the use of particle films. If used for sunburn protection on fruits, there is added cost to wash or brush the material off at harvest. Where overhead irrigation is used, or during rainy weather, the material can be partially washed off of plants, reducing effectiveness and requiring additional applications. Produce buyers can also have standards relating to the use or particle films and may not accept products with visible residues.

Mites Seem to be Everywhere

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

There are several reports of spider mites in multiple crops, with injury in tomatoes and a variety of cucurbits, mostly watermelon. Spider mites normally do well in hot, dry weather and we have not really been all that hot or dry, which makes it surprising that we are seeing such difficulties with them now. They tend to start out at field edges or by drive rows. Anywhere dust settles on the crop is a likely spot for the earliest infestations. In watermelon, infestations usually start in the crown and spread from there. The oldest leaves will take on a yellow color along the midrib with necrotic spots (Fig. 1). This damage can be misjudged as a disease. In tomatoes early damage starts off as tiny white specks or stippling on foliage (Fig. 2). Be sure to check for the mites on the underside of leaves to verify their presence (Fig. 3)

For control there are several good miticides out there, but you need high gallonages of water 50-70 gallons/A and thorough coverage of the top and underside of the foliage or you will not reach all the well-hidden mites. Agri-Mek has translaminar movement, so if it is sprayed on the upper leaf surface it will penetrate into the leaf and reside there. Portal works on all stages of mites while Acramite is primarily active on mite motile stages (not eggs) and has a long residual. Oberon can take longer to work (check back in 5-7 days) but will give excellent control. Zeal is a growth regulator and will not kill adults but will kill immature mites, it works especially well if you catch the infestation early on. As always be sure to check the label before spraying any pesticides.

Figure 1. Mite damage to watermelon crown leaves

Figure 2. Moderate two spotted spider mite feeding on tomato leaf

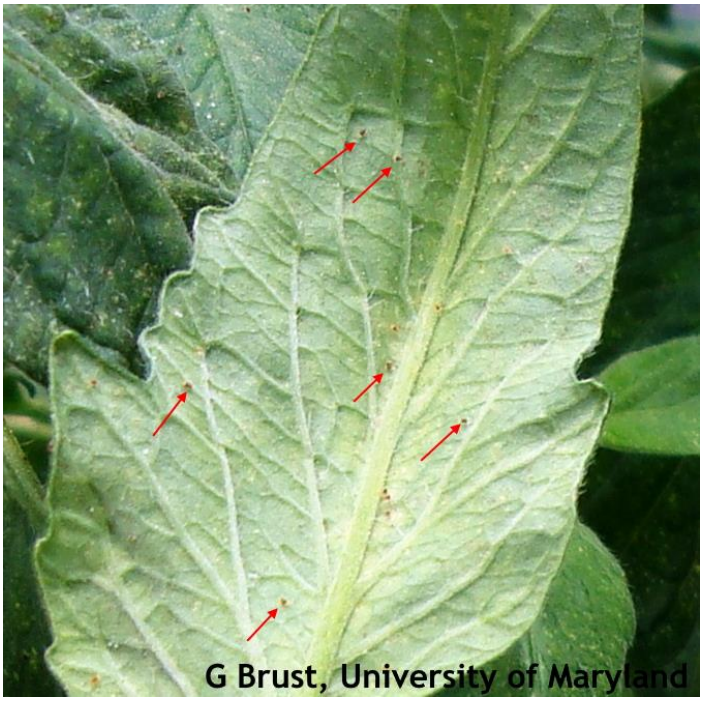


Figure 3. Mites are found on the underside of leaves (arrows) and can be difficult to see at times

Unusual Disease of Garlic Scapes Found in Maryland

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

Over the last few years, a grower noticed lesions developing on their garlic scapes which then collapsed in the field. In previous years these collapsed scapes amounted to only a small number, but this year the losses are much greater, approaching 30%. Symptoms consist of sunken lesions about ¼ to ½ inch long, that cause twisting, girdling and collapse of the scape. Lesions initially are cream to tan-colored but under rainy or very humid conditions, spore production by the fungus causes lesions to turn orange (Fig. 1 & 2). This disease is anthracnose of garlic, a new disease to Maryland and is caused by the fungus *Colletotrichum fioriniae*. The fungus may survive on crop residue in the soil from a previous garlic crop or the disease may be spread by infected bulbils used for propagation. Disease development is favored by rainy or very humid weather and warm temperatures (78-88º F). Anthracnose of garlic does not affect bulbs, but scape yield could be reduced as will bulbil production.

Reports from New England indicate that onion is most likely not affected by this fungus. *C. fioriniae* has also been reported as causing bitter rot on pear and anthracnose on celery and cherry tomato. Crop rotation away from any member of the onion family may help reduce disease incidence. Besides crops, weeds such as common lambsquarters, redroot pigweed, yellow nutsedge and common groundsel may also be infected with the pathogen but be symptomless. Because this is such a new disease of garlic, fungicide recommendations have yet to be determined. However, products that are labeled and effective against purple blight of onion may be useful against this disease.

Figure 1. Collapsed base of scape with white lesion and orange spores

Figure 2. Twisted orange scape stem

Fruit Crops

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

Stink Bug Numbers are High
High number of green stink bugs continue to be captured in our black light trap network, though not to the extent that they had been. Several sites are averaging between 30 and 40 per night. Continue scouting fruit crops for signs of damage. Green stink bugs are relatively susceptible to pyrethroids, whereas browns and brown marmorated are much less susceptible. For those two species, bifenthrin provides greater control than other pyrethroids

Vineyards
Japanese beetles have begun emerging and they can defoliate grape vines if present in high numbers. They are most likely to be found on the edges of vineyards and in the upper canopy on wine grapes *V. vinifera*. Mature grape vines can tolerate a good deal of defoliation. Grapes are more sensitive to defoliation after veraison (onset of fruit ripening).

Blueberries and Blackberries
Spotted wing drosophila has been captured in traps around blueberry plantings. Blueberries are less susceptible to SWD damage, and the larvae tend to be less noticeable in blueberry plantings. As such, it some entomologists recommend monitoring fruit for signs of damage prior to treating. This also depends on your market. Cane berries on the other hand are much more attractive and much more susceptible to SWD damage. Treatments for SWD should begin when flies are captured near cane berries. Spray programs that start with the most effective, broad spectrum products have resulted in better control than those that begin with softer chemistry. You can find insecticide efficacy rankings here: https://swdmanagement.org/wp-content/uploads/2021/05/SWD-rankings-document-2021.pdf.

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

Orange rust is a fungal disease that can affect black raspberries and blackberries. We have had several incidences of this disease found in new and established plantings this year.

Initial symptoms of orange rust are spindly shoots with clustered, misshapen, pale green to yellowish leaves. The leaves are covered with bright orange, powdery blisters on the underside. The plant becomes systemically infected and remains so for the rest of its life. The infected plants may give a bushy appearance since many short, upright shoots arise from one bud.

Orange rust does not usually kill plants, but it can significantly reduce vegetative growth and yield. The disease is caused by the fungus *Gymnoconia nitens*. The orange spores are spread by wind and infect leaves of healthy plants during long periods of leaf wetness provided by rain or dew. Orange rust is favored by relatively low temperatures (50-70°F) and wet conditions. The fungus is systemic and overwinters in the crown and roots of infected plants, leading to the production of new infected canes every year. Without management, the number of infected plants in a field may increase from year to year until most plants are infected.

Orange rust on thornless blackberries

Control starts with purchasing disease free plants. Remove surrounding wild brambles that could harbor the disease. Upon inspection of plants each spring, any infected plants should be dug up and destroyed promptly before rust pustules mature and spores are produced. The location of those plants should be clearly marked, and any new suckers arising from root pieces left in the ground should be removed and sprayed with an approved systemic herbicide. Management practices that improve air circulation, such as thinning out canes within the row, pruning out floricanes immediately after harvest, and effective weed control aid in disease control by reducing build-up of moisture in the planting. Some blackberry cultivars are reported to be resistant to orange rust, but no black raspberry cultivars are known to be resistant.

The best fungicide options are myclobutanil and propiconazole. Fungicides should be applied when the orange pustules are first seen before they burst open and release spores. None of these fungicides will cure an already infected plant but they can protect healthy plants from becoming infected. If a field has a history of orange rust, sprays should be initiated before blisters appear.

This article was adapted from https://www.canr.msu.edu/news/its_that_time_of_year_for_orange_rust_in_brambles

Top and bottom leaf views of orange rust symptoms in a new black raspberry planting.

Agronomic Crops

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

Corn
Scout for stink bugs in corn, especially fields in late terminated small grain cover crop and fields bordering wheat or barley. Between V6 and V14, stink bugs will cause cosmetic injury. However, thresholds are 10 bugs in 100 plants when sampled around the ear-zone from V14 to VT. This threshold almost triples once plants begin silking. You can find more information here: https://corn.ces.ncsu.edu/wp-content/uploads/2020/05/Corn-stink-bug-revised-2020.pdf?fwd=no.

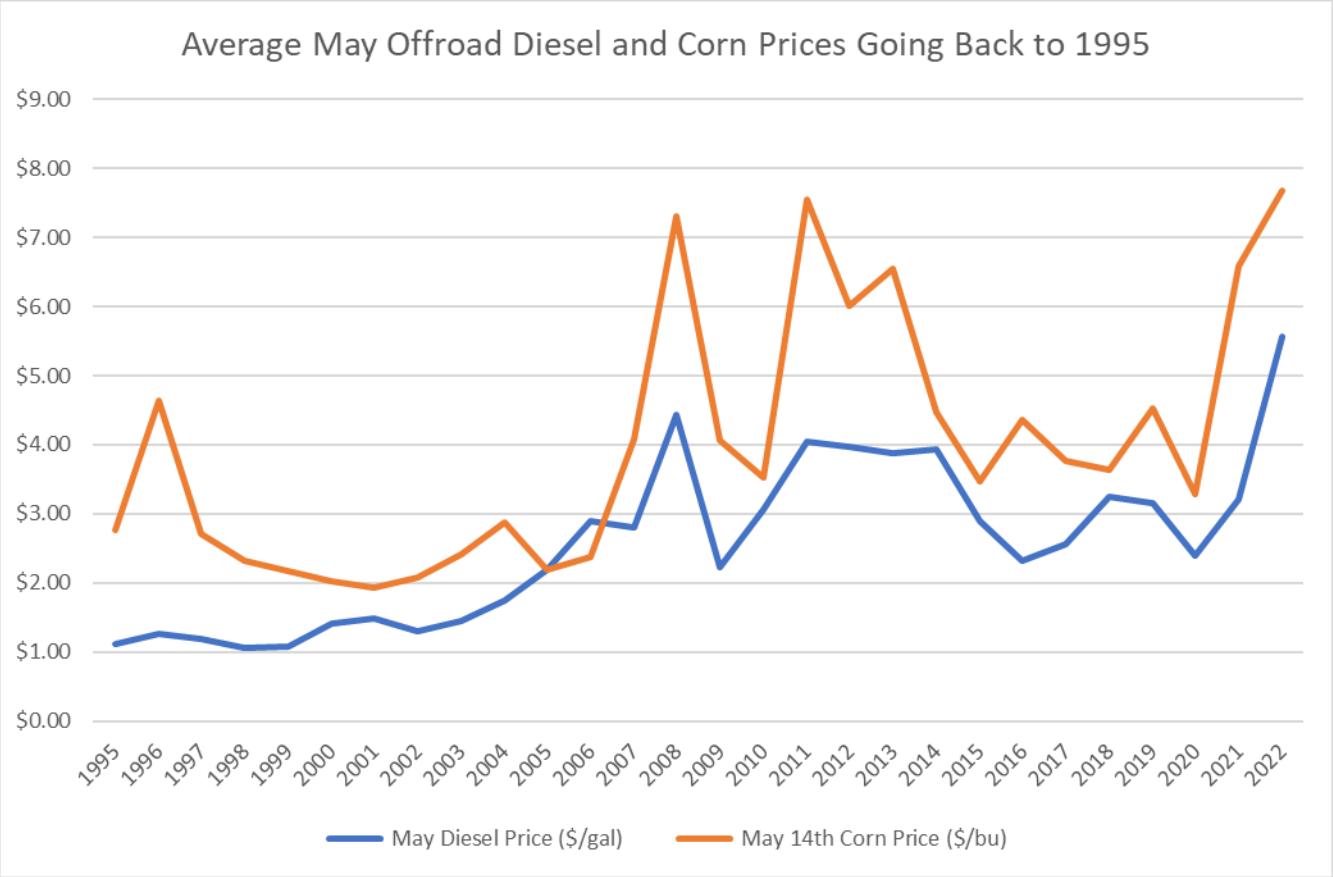
Soybean
Thrips feeding is noticeable as silvery streaking on leaves. However, thrips are only rarely associated with any yield impact to soybean and should not require a treatment. We are seeing spider mites begin to move into other crops,

begin monitoring for mite hotspots around field edges. Other important defoliators include bean leaf beetle, various worm species, and grasshoppers. However, these are less likely to trigger a defoliation threshold (conservatively set at 30-40% defoliation in full season beans) once the plants have a couple of trifoliates.

Is Irrigating Corn Worth it Considering the Price of Offroad Diesel?

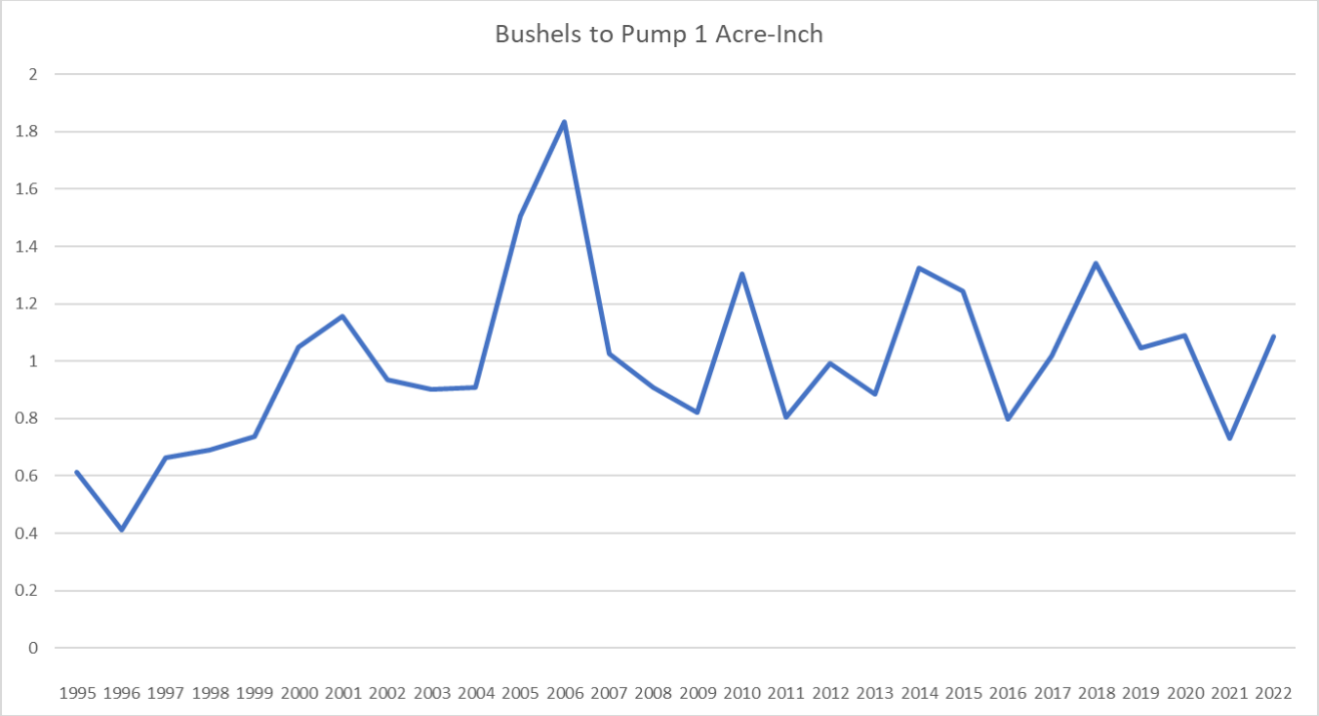
- *Nate Bruce, Farm Business Management Specialist*, nsbruce@udel.edu and *James Adkins, Irrigation Engineer*, adkins@udel.edu

Producers across the region are looking at ways to cut down on production costs this season. With current offroad diesel prices, some producers may evaluate cutting down on irrigation. Below is a chart that lists the average price of May offroad diesel prices ($/gallon) and May corn prices ($/bushel) going back to 1995. May corn prices are almost always higher than May offroad diesel prices (the two exceptions being 2005 and 2006). Even with the current volatility in the commodity markets, this trend has continued in 2022.



Across 15 pumping plant performance evaluations performed on diesel power units, on average 1.5 gallons of diesel were required to irrigate one acre-inch. Testing results ranged from 1.09 gal/ac-in for the most efficient low pressure power unit to 1.96 gal/ac-in for a 50-year-old high pressure pump with grossly oversized power unit. The 35+ electric systems tested averaged roughly ½ of the operating cost of diesel depending on electric provider cost structure.

Below is a graph that shows the number of bushels of corn that is required to justify one inch of irrigation expense at average May diesel and corn prices. Using the average May offroad diesel price multiplied by the tested average of 1.5 gal/ac-in divided by the average May corn price to find the bushels needed to cover the irrigation expense.



The results show that despite the extreme current diesel price, that the cost of operation relative to corn price is still below '01,'05,'06,'10,'14,'15,'18 & '20. The average pumping plant will need to increase corn yield by just 1.09 bushels for each inch of irrigation water applied to breakeven in 2022. The 20-year seasonal irrigation demand for Delmarva has been running 9 ac-in for corn or 9.81 bushels of corn to breakeven on diesel cost for pumping in the current pricing environment. Keep in mind that the costs for electric systems will be roughly half or 4.9 bu./a. Cutting down on irrigation due to diesel prices is not a production area to consider cutting back on in 2022.

Resources for 2022 Corn and Soybean Fungicide Recommendations – *Alyssa Koehler, Extension Field Crops Pathologist*; akoehler@udel.edu

We have had a few samples of *Pythium* spp. in corn, but overall there has been limited disease in field crops so far this season. As growth progresses, we will continue to monitor for common foliar diseases. In fields where a fungicide application may be needed, the Crop Protection Network has multiple resources to aid in selection of fungicide products.

The Corn Disease Working Group has recently updated the 2022 Fungicide Efficacy for Control of Corn Diseases.

In soybeans, the North Central Regional Committee on Soybean Diseases (NCERA-137) has updated recommendations for 2022 Fungicide Efficacy for Control of Soybean Foliar Diseases.

Each of these tables provide rating of product performance across multiple diseases based on trials conducted by Extension specialists across the country.

CROP PROTECTION NETWORK
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Fungicide mode of action groups:
Group 11 QoI Strobilurins
Group 3 DMI Triazoles
Group 7 SDHI

Efficacy categories:
NR=Not Recommended; P=Poor; F=Fair; G=Good; VG=Very Good;
E=Excellent; NL=Not Labeled for use against this disease;
U =Unknown efficacy or insufficient data to rank product

Fungicide Efficacy for Control of Corn Diseases Table (04/2022)

	Active ingredient (%)	Product/Trade name	Rate/A (fl oz)	Anthracnose leaf blight	Common rust	Eyespot	Gray leaf spot	Northern corn leaf blight	Southern rust	Tar spot[1]	Harvest restriction[2]
11	Azoxystrobin 22.9%	Quadris 2.08 SC, multiple generics	6.0 - 15.5	VG	E	VG	E	G	VG	NL	7 days
11	Pyraclostrobin 23.6%	Headline 2.09 EC/SC	6.0 - 12.0	VG	E	E	E	VG	VG	NL	7 days
11	Picoxystrobin	Aproach 2.08 SC	3.0 – 12.0	VG	VG-E	VG	F-VG	VG	G	G[3]	7 days
3	Flutriafol 20.9%	Xyway LFR 1.92 SC Xyway 3D 2.5 SC	LFR: 7.6-15.2 3D: 5.8-11.8	NL	U	NL	G	VG	NL	NL	N/A
3	Propiconazole 41.8%	Tilt 3.6 EC, multiple generics	2.0 - 4.0	NL	VG	E	G	G	F	NL	30 days
3	Prothioconazole 41.0%	Proline 480 SC	5.7	U	VG	E	U	VG	G	NL	14 days
3	Tebuconazole 38.7%	Folicur 3.6 F, multiple generics	4.0 - 6.0	NL	U	NL	U	VG	F	NL	36 days
3	Tetraconazole 20.5%	Domark 230 ME	4.0 – 6.0	U	U	U	E	VG	G	G[3]	R3 (milk)
11 3	Azoxystrobin 13.5% Propiconazole 11.7%	Quilt Xcel 2.2 SE, multiple generics	10.5 - 14.0	VG	VG-E	VG-E	E	VG	VG	NL	30 days
7 11 3	Benzovindiflupyr 2.9% Azoxystrobin 10.5% Propiconazole 11.9%	Trivapro 2.21 SE	13.7	U	U	U	E	VG	E	G-VG	30 days
3 11	Cyproconazole 7.17% Picoxystrobin 17.94%	Aproach Prima 2.34 SC	3.4 – 6.8	U	U	U	E	VG	G	G-VG[3]	30 days
3 11	Flutriafol 19.3% Fluoxastrobin 14.84%	Fortix 3.22 SC Preemptor 3.22 SC	4.0 -6.0	U	U	U	E	VG	VG	G-VG[3]	R4 (dough)
3 7	Flutriafol 26.47% Bixafen 15.55%	Lucento	3.0-5.5	U	U	U	VG-E	VG	VG	G[3]	R4
3 11	Flutriafol 18.63% Azoxystrobin 25.30%	TopGuard EQ	5.0-7.0	U	F	U	VG	G-VG	G-VG	G-VG[3]	7 days
3 11	Mefentrifluconazole 17.56% Pyraclostrobin 17.56%	Veltyma	7.0-10.0	U	U	U	VG-E	VG-E	VG	VG	21 days
3 11 7	Mefentrifluconazole 11.61% Pyraclostrobin 15.49% Fluxapyroxad 7.74%	Revytek	8.0-15.0	U	U	U	VG-E	VG-E	VG	VG	21 days
3 11	Prothioconazole 16.0% Trifloxystrobin 13.7%	Delaro325 SC	8.0-12.0	VG	E	VG	E	VG	G-VG	G-VG	14 days
3 7 11	Prothioconazole 14.9% Trifloxystrobin 13.1% Fluopyram 10.9%	Delaro Complete 3.83 SC	8.0-12.0	U	U	U	E	VG	G-VG	VG	35 days
7 11 3	Pydiflumetofen 7.0% Azoxystrobin 9.3% Propiconazole 11.6%	Miravis Neo 2.5 SE	13.7	U	U	U	E	VG-E	VG	G-VG	30 days
11 7	Pyraclostrobin 28.58% Fluxapyroxad 14.33%	Priaxor 4.17 SC	4.0 – 8.0	U	VG	U	VG	VG-E	VG	G-VG	21 days
11 3	Pyraclostrobin 13.6% Metconazole 5.1%	Headline AMP 1.68 SC	10.0 - 14.4	U	E	E	E	VG	G	G-VG	20 days
11 3	Trifloxystrobin 32.3% Prothioconazole 10.8%	Stratego YLD 4.18 SC	4.0 - 5.0	VG	E	VG	E	VG	G	NL	14 days
3 11	Tetraconazole 7.48% Azoxystrobin 9.35%	Affiance 1.5 SC	10.0-14.0	U	G-VG	U	G-VG	G-VG	G	G[3]	7 days

Indicates product with mixed fungicide classes

[1]Fungicide application timing is extremely important and needs to be made near the onset of the tar spot symptoms. Efficacy ratings based on limited site locations from 2018 to 2021. [2]Harvest restrictions are listed for field corn harvested for grain. Restrictions may vary for other types of corn (sweet, seed, or popcorn, etc.), and corn for other uses such as forage or fodder. [3]A 2ee label is available for several fungicides for control of tar spot, however efficacy data are limited. Check 2ee labels carefully, as not all products have 2ee labels in all states. This information is provided only as a guide. It is the applicator's legal responsibility to read and follow all current label directions. Reference in this publication to any specific commercial product is for general information only and does not constitute an endorsement or recommendation by the CDWG. Individuals using such products assume responsibility for their use in accordance with current directions of the manufacturer. Members or participants in the CDWG assume no liability resulting from the use of these products.

CROP PROTECTION NETWORK
A Product of Land Grant Universities

Fungicide mode of action groups:
Group 11 QoI Strobilurins
Group 3 DMI Triazoles
Group 1 MBC Thiophanates
Group 7 SDHI Carboxamides
Group 29 2,6-Dinitro-anilines

Efficacy categories:
P=Poor; F=Fair; G=Good; VG=Very Good; E=Excellent;
NL=Not Labeled for use against this disease; NR=Not Recommended;
U=Unknown efficacy or insufficient data to rank product

Fungicide Efficacy for Control of Soybean Foliar Diseases Table (02/2022)

	Active ingredient (%)	Product/Trade name	Rate/A (fl oz)	Aerial web blight	Anthracnose	Brown spot[2]	Cercospora leaf blight[3]	Frogeye leaf spot[4]	*Diaporthe* (Pod and stem blight)	Soybean rust	Target spot	White mold[5]	Harvest restriction[6]
11	Azoxystrobin 22.9%	Quadris 2.08 SC, multiple generics	6.0 – 15.5	VG	VG	P-G	P	P	U	G-VG	P-F	P	14 days
11	Fluoxastrobin 40.3%	Aftershock 480 SC, Evito 480 SC	2.0 – 5.7	VG	G	P-G	P	P	U	U	U	NL	30 days, R5
11	Picoxystrobin 22.5%	Aproach 2.08 SC	6.0 – 12.0	VG	G	P-G	P	P	U	G	U	G[8]	14 days
11	Pyraclostrobin 23.6%	Headline 2.09 EC/SC	6.0 – 12.0	VG	VG	P-G	P	P	U	VG	P-F	NL	21 days
3	Cyproconazole 8.9%	Alto 100SL	2.75 – 5.5	U	U	VG	F	F	U	VG	U	NL	30 days
3	Flutriafol 11.8%	Topguard 1.04 SC	7.0 – 14.0	U	VG	VG	P-G	G-VG	U	VG-E	P	F	21 days
3	Propiconazole 41.8%	Tilt 3.6 EC, multiple generics	4.0 – 6.0	P	VG	G	NL	F	NL	VG	U	NL	R5
3	Prothioconazole 41.0%	Proline 480 SC	2.5 – 5.0	NL	NL	NL	NL	G-VG	NL	VG	U	F	21 days
3	Tetraconazole 20.5%	Domark 230 ME	4.0 – 5.0	NL	VG	VG	P-G	F-G	U	VG-E	P	F	R5
7	Boscalid 70%	Endura 0.7 DF	3.5 – 11.0	U	NL	VG	U	P	NL	NL	U	VG	21 days
7	Inpyrfluxam 31.25%	Excalia SC	2.0	E	NL	NL	NL	NL	NL	U	NL	NL	R5
1	Thiophanate-methyl	Topsin-M, multiple generics	10.0 – 20.0	U	U	U	F	VG	U	G	U	F	21 days
29	Fluazinam 40.0%	Omega 500 DF	0.75 – 1.0 pts	NL	NL	NL	NL	NL	NL	NL	U	G	R3
11 3	Azoxystrobin 25.3% Flutriafol 18.63%	Topguard EQ 4.29 SC	5.0 – 7.0	VG	U	VG	U	G-VG	U	E	P	U	21 days
11 3	Azoxystrobin 18.2% Difenoconazole 11.4%	Quadris Top 2.72 SC	8.0 – 14.0	U	U	G-VG	P-G	VG	F-G	VG	P	NL	14 days
11 3	Azoxystrobin 19.8% Difenoconazole 19.8%	Quadris Top SBX 3.76 SC	7.0 – 7.5	VG	U	G-VG	P-G	VG	F-G	VG	F-G	U	14 days
11 3	Azoxystrobin 7.0% Propiconazole 11.7%	Quilt 1.66 SC, multiple generics	14.0 – 20.5	U	U	G	F	F	U	VG	P	NL	21 days
11 3	Azoxystrobin 13.5% Propiconazole 11.7%	Quilt Xcel 2.2 SE	10.5 – 21.0	E	VG	G	F	F	U	VG	P	NL	R6
7 11 3	Benzovindiflupyr 2.9% Azoxystrobin 10.5% Propiconazole 11.9%	Trivapro	13.7 – 20.7	E	U	G-VG	P-G	F-G	G	VG-E	U	NL	14 days, R6
3 11	Cyproconazole 7.17% Picoxystrobin 17.94%	Aproach Prima 2.34 SC	5.0 – 6.8	VG	U	G	P-G	F-G	U	VG-E	F-G	NL	14 days
7 3	Fluopyram 17.4% Prothioconazole 17.4%	Propulse 3.34 SC	6.0 – 10.2	NL	NL	U	NL	U	U	U	NL	G	21 days

Indicates product with mixed fungicide classes

[1] Multiple fungicides are labeled for soybean rust only, powdery mildew, and Alternaria leaf spot, including tebuconazole (multiple products) and myclobutanil (Laredo). Contact fungicides such as chlorothalonil may also be labeled for use. [2] In areas where QoI-fungicide resistant isolates of the brown spot pathogen are present, QoI fungicides may result in poor disease control. [3] Cercospora leaf blight efficacy relies on accurate application timing, and standard R3 application timings may not provide adequate disease control. Fungicide efficacy may improve with earlier or later applications; however, efficacy has been inconsistent with some products. Fungicides with a solo or mixed QoI or MBC mode of action may not be effective in areas where QoI or MBC resistance has been detected in the fungal population that causes Cercospora leaf blight. [4] In areas where QoI-fungicide resistant isolates of the frogeye leaf spot pathogen are not present, QoI fungicides may be more effective than indicated in this table. [5] White mold efficacy is based on R1-R2 application timing, and lower efficacy is obtained at R3 or later application timings, or if disease symptoms are already present at the time of application. [6] Harvest restrictions are listed for soybean harvested for grain. Restrictions may vary for other types of soybean (edamame, etc.) and soybean for other uses such as forage or fodder. [7] Stratego YLD has a supplemental label (2ee) for white mold on soybean only in IL, IN, IA, MI, MN, NE, ND, OH, SD, WI. [8] Rating is based on two applications of a 9 fl oz/A rate of Aproach at R1 and R3.

Many products have specific use restrictions about the amount of active ingredient that can be applied within a period of time or the amount of sequential applications that can occur. Please read and follow all specific use restrictions prior to fungicide use. This information is provided only as a guide. It is the responsibility of the pesticide applicator by law to read and follow all current label directions. Reference to products in this publication is not intended to be an endorsement to the exclusion of others that may be similar. Persons using such products assume responsibility for their use in accordance with current directions of the manufacturer. Members or participants in the NCERA-137 group assume no liability resulting from the use of these products.

Table continued on next page

CROP PROTECTION NETWORK
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Group 1 MBC Thiophanates
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Table continued from previous page

Fungicide Efficacy for Control of Soybean Foliar Diseases Table (02/2022)

	Active ingredient (%)	Product/Trade name	Rate/A (fl oz)	Aerial web blight	Anthracnose	Brown spot[2]	Cercospora leaf blight[3]	Frogeye leaf spot[4]	*Diaporthe* (Pod and stem blight)	Soybean rust	Target spot	White mold[5]	Harvest restriction[6]
7 3	Bixafen 15.5% Flutriafol 26.47%	Lucento 4.17 SC	3.0 – 5.5	VG	U	VG	F-G	VG	U	VG-E	F-G	U	21 days
11 3	Fluoxastrobin 14.84% Flutriafol 19.3%	Fortix SC, Preemptor SC	4.0 – 6.0	U	U	G-VG	P-G	G-VG	U	U	P	U	R5
11 3	Trifloxystrobin 13.7% Prothioconazole 16.0%	Delaro 325 SC	8.0 – 11.0	VG	U	VG	U	G-VG	U	U	NL	NL	21 days
7 11 3	Fluopyram 10.9% Trifloxystrobin 13.1% Prothioconazole 14.9%	Delaro Complete 3.83 SC	8.0 – 11.0	U	U	VG	U	U	U	U	NL	U	21 days
7 3	Pydiflumetofen 6.9% Difenoconazole 11.5%	Miravis Top 1.67 SC	13.7	VG	U	VG	F-G	VG	G	NL	F-G	U	14 days
11 7	Pyraclostrobin 28.58% Fluxapyroxad 14.33%	Priaxor 4.17 SC	4.0 – 8.0	E	VG	G-VG	P-G	P-F	U	VG-E	F-G	P	21 days
7 11 3	Fluxapyroxad 14.33% Pyraclostrobin 28.58% Tetraconazole 20.50%	Priaxor D 4.17 SC, 1.9 SC	4.0 each component	VG	U	VG	P-G	F-G	G	VG-E	F-G	P	21 days, R5
11 3	Trifloxystrobin 32.3% Prothioconazole 10.8%	Stratego YLD 4.18 SC[7]	4.0 – 4.6	VG	VG	G	F	F-G	U	VG	P	NL	21 days
11 3	Azoxystrobin 9.35% Tetraconazole 7.48%	Affiance 1.5 SC	10.0 – 14.0	U	VG	VG	F	F-G	U	U	P	NL	14 days, R5
11 3	Fluoxastrobin 17.76% Tetraconazole 17.76%	Zolera FX 3.34 SC	4.4 – 6.8	U	U	U	U	F-G	U	U	U	U	30 days, R5
1 3	Thiophanate-methyl 21.3% Tetraconazole 4.2%	Acropolis	20.0 – 23.0	NL	U	U	U	VG	U	E	U	U	R5
7 11 3	Fluxapyroxad 7.74% Pyraclostrobin 15.49% Mefentrifluconazole 11.61%	Revytek	8.0 – 15.0	VG	U	VG	F-VG	VG	U	E	F-VG	P	21 days
11 3	Pyraclostrobin 17.56% Mefentrifluconazole 17.56%	Veltyma	7.0-10.0	U	U	U	U	U	U	U	U	NL	21 days

[1] Multiple fungicides are labeled for soybean rust only, powdery mildew, and Alternaria leaf spot, including tebuconazole (multiple products) and myclobutanil (Laredo). Contact fungicides such as chlorothalonil may also be labeled for use. [2] In areas where QoI-fungicide resistant isolates of the brown spot pathogen are present, QoI fungicides may result in poor disease control. [3] Cercospora leaf blight efficacy relies on accurate application timing, and standard R3 application timings may not provide adequate disease control. Fungicide efficacy may improve with earlier or later applications; however, efficacy has been inconsistent with some products. Fungicides with a solo or mixed QoI or MBC mode of action may not be effective in areas where QoI or MBC resistance has been detected in the fungal population that causes Cercospora leaf blight. [4] In areas where QoI-fungicide resistant isolates of the frogeye leaf spot pathogen are not present, QoI fungicides may be more effective than indicated in this table. [5] White mold efficacy is based on R1-R2 application timing, and lower efficacy is obtained at R3 or later application timings, or if disease symptoms are already present at the time of application. [6] Harvest restrictions are listed for soybean harvested for grain. Restrictions may vary for other types of soybean (edamame, etc.) and soybean for other uses such as forage or fodder. [7] Stratego YLD has a supplemental label (2ee) for white mold on soybean only in IL, IN, IA, MI, MN, NE, ND, OH, SD, WI. [8] Rating is based on two applications of a 9 fl oz/A rate of Aproach at R1 and R3.

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UNITED SOYBEAN BOARD

The CPN would like to thank the United Soybean Board for their support of this publication.

Scouting for Soybean Cyst Nematode –

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

Soybean Cyst Nematode consistently ranks as the most yield limiting pathogen of soybeans across the US, with average annual yield losses estimated over $1 billion dollars. SCN and other nematodes are often silent yield robbers, being present without noticeable aboveground symptoms. If symptoms from SCN do occur, they can look similar to other production challenges like nutrient deficiency, soil compaction, drought stress, or other diseases. SCN can inhibit Rhizobium nodule formation, causing chlorosis or yellowing of soybeans in affected areas of the field. Due to the lack of consistent or obvious aboveground symptoms, it is very common for SCN to go unknown until severe infestation develops (Figure 1). Scouting soybean roots for SCN females in season and conducting fall soil samples are two ways to check your field for SCN. Yellow to white females can be found on roots from about six weeks after planting through the end of the season. While females on the roots confirm the presence of SCN, they do not provide information on the level of infestation. Soil samples are the best method to assess overall populations across the field. Soil sampling can be conducted at any time, but fall samples provide a good snapshot of end of season populations and can be collected when already out for routine fertility sampling. We will discuss the steps to collect soil samples for SCN in an August article. Today I will introduce the steps to scout for SCN females on roots:

Figure 1. Soybeans with healthy looking foliage, but high levels of SCN in the soil

When to Sample

Scouting for SCN females on roots can occur 6 weeks after planting up until 3-4 weeks before harvest. Digging plants earlier in the season is generally more effective because new roots surrounding the base of the plant are easier to dig and not as deep into the soil profile.

Where to Sample

When scouting a field that has never been checked for SCN, you can target any areas with yellowing or stunting, but it is also a good idea to include healthy looking plants since SCN can be present without any aboveground symptoms. Areas of the field that tend to be higher risk for SCN include: near a field entrance, areas that have been flooded, areas with pH greater than

7, areas where yield has historically been lower, areas where weed control is not as good.

How to Sample

Using a shovel, dig 6 to 8 inches from the base of the plant to try to remove as much of the root system as possible. Avoid tugging or pulling on the plant since you will leave much of the root system behind in the soil. Gently shake off the soil and check the root system for white to light-yellow lemon-shaped adult SCN females (Figure 2). SCN females are much smaller than the nitrogen-fixing nodules (Figure 3). A hand lens or magnifying glass can make looking for SCN females easier, especially when scouting in sandy soils where sand particles can resemble SCN females. Gently swirling roots in a bucket of water can help to remove soil particles without dislodging the females.

Figure 2. Soybean root system with SCN females indicated at arrows

Figure 3. Soybean root system with nodulation (left arrow) and SCN females (right arrow)

What to do Next

If you find SCN females or suspect nematodes are present in the field, a soil test is the next step to estimate population density in the field. For many years, nematode populations were managed through a single source of resistance, PI88788. Over the past few decades, we have seen a break down in this resistance and nematodes are reproducing at far higher rates than they should. If high levels of SCN are present, rotation of crop and variety are the best steps to reduce populations. Corn and wheat are both non-host options. While the PI88788 resistance gene still accounts for over 95% of soybean acreage, there are new resistance genes coming out on the market. Seed treatments are another control option. We are currently screening multiple seed treatment products for efficacy in our region and we will post those results as they become available later this year. From 2019-2021, we also conducted regional surveys across 311 field sites, results will be published soon and we will share an overview in a WCU later this summer. If you are interested in learning more about SCN, check out thescncoalition.com to *talk todes*.

General

Healthy Ways to Cope with Stress - *Hannah Sherman, Community Health Intern, Sarah Goldring, Extension Agent,* sbercaw@udel.edu, *Gina Crist, Extension Community Health Specialist,* gcrist@udel.edu

The COVID-19 pandemic has had a major effect on our lives. Many of us are facing challenges that can be stressful and overwhelming. Learning to cope with stress in a healthy way will help you, the people you care about, and those around you become more resilient. Below are some ways to decrease your stress levels. This week, try to avoid electronics an hour before going to sleep. Instead, write down or think about 10 things you are grateful for. Or, find something else on this list to try out.

- Take breaks from social media and electronics. Consider limiting news to just a couple times a day and disconnecting from phone, tv, and computer screens for a while.
- Take care of your body- skin care, exercise, hydrate, sun protection, etc.
- Eat plenty of fruits and vegetables, lean protein, whole grains, and fat-free or low-fat milk and milk products. Eating well also means limiting saturated fats, cholesterol, salt, and added sugars.
- Move more and sit less -- every little bit of physical activity helps. You can start small and build up to 150 minutes a week that can be broken down to smaller amounts such as 20 to 30 minutes a day.
- Take deep breaths, stretch, or meditate. Even just taking one deep breath can make a difference in how you're feeling.
- Limit alcohol intake. Choose not to drink, or drink in moderation by limiting consumption (one drink a day for women and two drinks a day for men) on days that alcohol is consumed.
- Avoid smoking and the use of other tobacco products.
- Make time to unwind. Try to do some other activities you enjoy.
- Connect with others. Talk with people you trust about your concerns and how you are feeling.

Link to source: https://www.cdc.gov/mentalhealth/stress-coping/index.html

Announcements

Warm Season Annual Forage Pasture Walk

Thursday, July 7, 2022 6:00 - 8:15 p.m.
Mule Run Farms, Houston, DE 19954

Join University of Delaware Extension, University of Maryland Extension, and the Blessings of Houston, DE for an educational field day. The Blessings raise livestock and will discuss grazing management and how they incorporate annual forages into their grazing system to boost pasture production. Additional topics covered will include selection and use of annual forages in a pasture system, insect and weed management on pasture, and enterprise budgeting for forages.

Credits: Pesticide and Nutrient Management credits will be applied for.

Registration: Mark your calendar and register by Friday July 1st at : https://go.umd.edu/julypasturewalk The meeting is free and everyone interested in attending is welcome. If you have special needs in accessing this program, please call the office two weeks in advance. 302-831-2506.

Location Details: *The farm does not have a street number. The GPS coordinates are 38.916176, -75.482979. It is located between 1139 and 2122 Front Street and is approximately 0.5 miles west of the Holly Hill Road and Front Street intersection. Look for signs to help direct you to the correct location.*

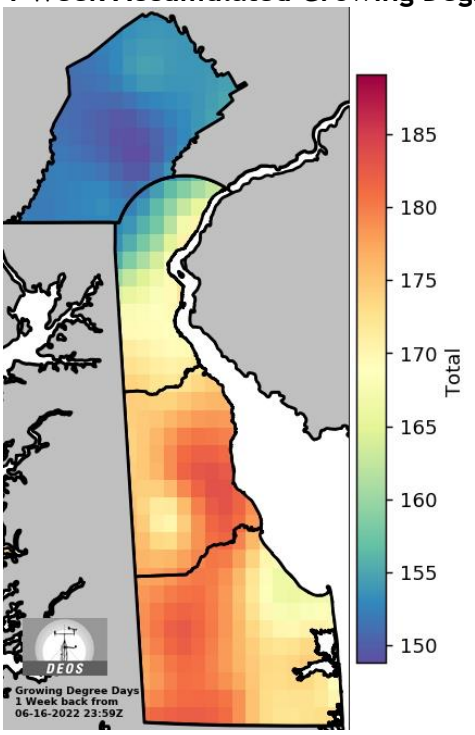
University of Delaware Weed Science Field Day

June 29, 2022 8:00-10:00 a.m.
UD Carvel Research and Education Center
16483 County Seat Highway, Georgetown, DE

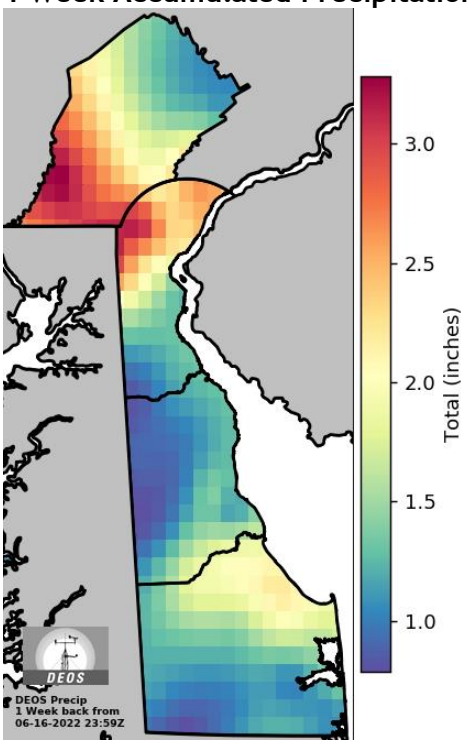
Save the date!

Weather Summary

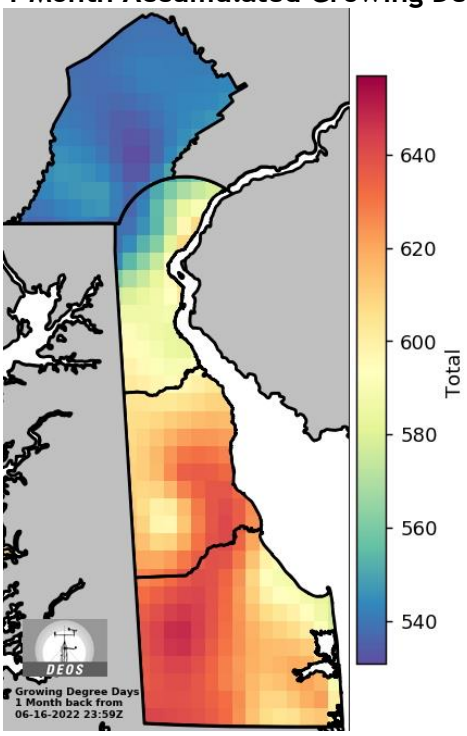
1 Week Accumulated Growing Degree Days



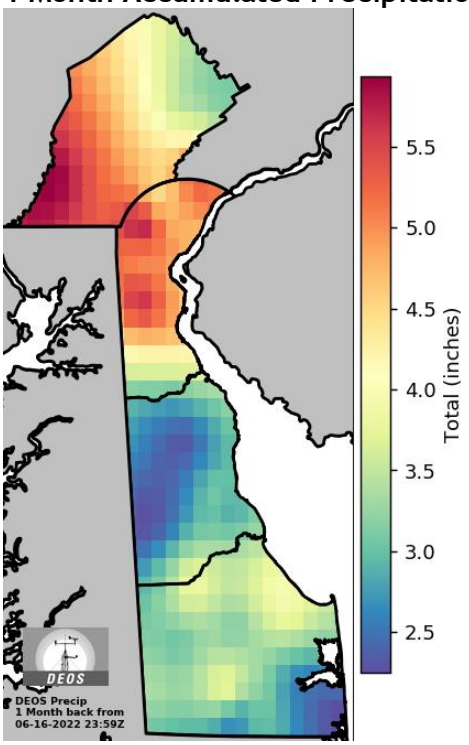
1 Week Accumulated Precipitation



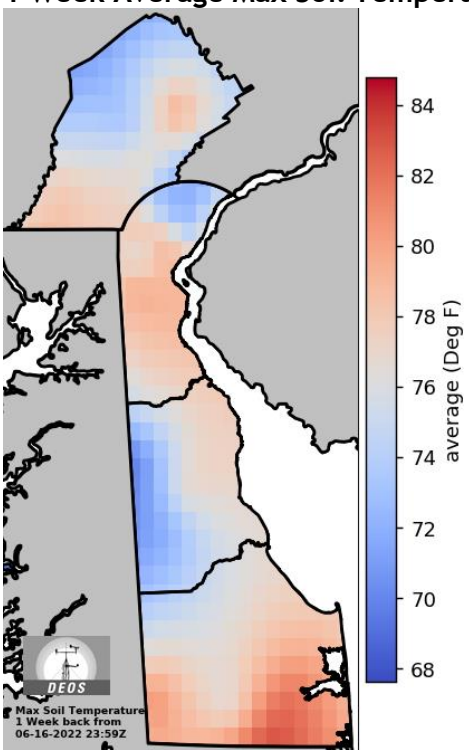
1 Month Accumulated Growing Degree Days



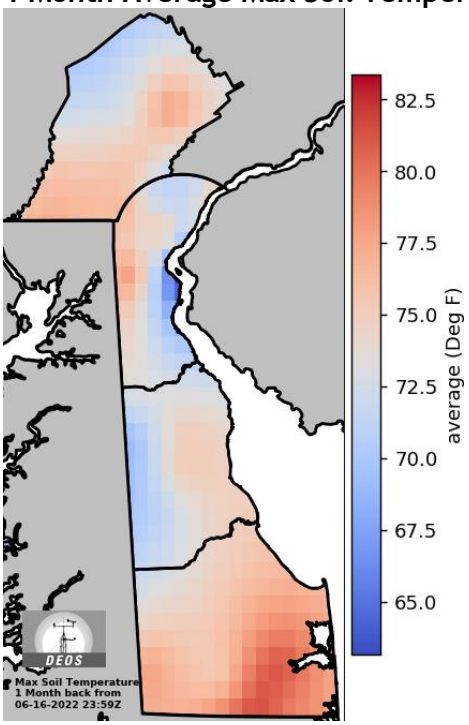
1 Month Accumulated Precipitation



1 Week Average Max Soil Temperature



1 Month Average Max Soil Temperature



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!
Thanks!! Emmalea (emmalea@udel.edu)

Weekly Crop Update is compiled and edited by Emmalea Ernest, Scientist – Vegetable Crops

Reference to commercial products or trade names does not imply endorsement by University of Delaware Cooperative Extension or bias against those not mentioned.