



Volume 27, Issue 21

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Vegetable Crops

Vegetable Crop Insect Scouting - David Owens, Extension Entomologist;
owensd@udel.edu

Tomato

Corn earworm management was discussed in a post by UMD earlier this week and can be found here:

https://extension.umd.edu/sites/extension.umd.edu/files/_docs/VegetableFruitNews10-5.pdf.

This from Kelly Hamby et al. (UMD): Eggs can be detected on the leaves directly below the flower clusters, typically on the highest clusters on the plant. For a reduced spray approach, inspect 20-30 plants for signs of eggs, and consider initiating sprays if ~10% of the plants have at least 1 egg, with subsequent sprays at 3 damaged fruit per 100 unripe (Kuhar et al. 2006). Given the number of insect pests (armyworms, hornworms, stinkbugs, etc.) that occur in tomatoes, a 7 to 10-day interval once fruit begins to set is often used for insect management. Pyrethroids (Group 3A) offer poor to moderate control of corn earworm in the Mid-Atlantic, and will not control heavy infestations or large worms. In addition to the products mentioned above, several other effective insecticide options are labeled for tomato, including Avaunt (Group 22), Proclaim (Group 6), Rimon (Group 15), and Exirel (Group 28). It is important to rotate insecticide classes within a season. ALWAYS read pesticide labels carefully and follow all instructions; the information

presented here does not substitute for label instructions.

Beans

Continue scouting for corn earworm. Moths are present in fields and are attracted to blossoms to feed. Pyrethroids alone may not provide adequate control. Something of interest, our blacklight traps do not often capture more than a handful of moths per night even though pheromone traps indicate potentially large populations active in the region. Thresholds for lima beans are 1 per 6 row ft. Non-pyrethroid control options include Lannate, Blackhawk and Radiant, Intrepid, and Coragen.

Sweet Corn

Corn earworm management in vegetables was recently discussed in a UMD article that went out earlier this week and can be found here:

https://extension.umd.edu/sites/extension.umd.edu/files/_docs/VegetableFruitNews10-5.pdf

Moth captures remain quite high. Vial testing results indicate that 50% of moths are surviving pyrethroid challenge. Pyrethroids used ALONE may require shorter spray intervals, especially during the first week of silk. If using Lannate, use the higher rates. Besiege or Coragen both have chlorantraniliprole in them, this active ingredient is very good against moths and these products should be in the rotation, especially earlier in the silking period when moth activity is greatest. They are both translaminar products, especially helpful when wet weather is forecast.

Moth trap captures are uploaded to our website by Tuesday and Friday. Thresholds and trap

captures can be found here:
<http://extension.udel.edu/ag/insect-management/insect-trapping-program/>. Trap captures from Thursday are as follows:

Trap Location	BLT - CEW	Pheromone CEW
	3 nights total catch	
Dover	6	107
Harrington	3	123
Milford	7	195
Rising Sun	11	206
Wyoming	4	103
Bridgeville	6	181
Concord	7	153
Georgetown	6	174
Greenwood	3	
Laurel	8	138
Seaford	5	86
Trap Pond	29	0
Lewes	3	132

Cover Crop Decisions for Vegetable

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

With cover crop season coming up, vegetable growers will have decisions to make on what cover crops to plant and how best to grow and use them. The following is the first in a series revisiting this topic.

Cover crop acreage has been growing in the region, largely due to nutrient management efforts, cost share programs and recent programs encouraging farmers to grow cover crops for soil health benefits and soil improvement.

Nutrient management goals and soil health goals are not necessarily the same. In nutrient management-based cover crop programs, the goals are to have crops that can take up residual nitrogen and also provide cover to reduce soil erosion losses. Non-legumes predominate, with most of the acres planted in small grains such as rye and some recent use of radishes. No fertilizer can be used with cover crops in these programs. In this case the answer to the question above is that a cover is being grown.

While there will be soil health benefits, they are not maximized.

In contrast, when soil improvement is the primary goal, the cover crops are grown as crops. You are growing plants to maximize the benefits they provide. To increase organic matter and improve soil health the main goal is to produce maximum biomass above ground and below ground. A second important goal is to provide different types of organic matter (such as with cover crop mixtures) to support a diverse soil microbial environment.

In other cases, the goals will be different. With leguminous cover crops a goal may be to maximize the amount of nitrogen fixed. With soil compaction reducing crops such as radishes, the goal is to maximize the amount of "biodrilling" (i.e. the amount of tap roots being produced). With biofumigant crops, the goal is to maximize the production of fumigant-like chemicals by the crops. With mulch-based systems, the goal is to maximize above-ground biomass.

What these soil improvement and specific use goals have in common is the need to treat the cover crop as a crop in order to optimize plant growth. This includes seeding at the proper rate to achieve optimal stands, planting at the right time, using seeding methods to get maximum seed germination and plant survival, having sufficient fertility to support good plant growth, providing water during dry periods, managing pests (insects, diseases, weeds), and inoculating legumes. If cover crop mixtures are being used, the ratios of seeds being planted must be considered to have the best balance of plants in the final stand.

The best cover crop stands are obtained with a drill or seeder that places the seed at the proper depth, at the proper seeding rate, with good soil to seed contact. Fertilization and liming programs should be used to support season-long growth - fertilizers and other soil amendments will be necessary in most cases. Nitrogen will need to be added for non-legumes.

When the crop is terminated is also key. The cover crops should be allowed to grow to the stage that maximizes the benefits they have to offer before killing the crops. Allowing a winter cover to grow for an extra week in the spring

can make a large difference in the amount of biomass produced.

Winter-Killed Cover Crops for Vegetable

Growers - Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu

Cover crops that put on significant growth in the fall and then die during the winter can be very useful tools for vegetable cropping systems. These winter-killed cover crops add organic matter, recycle nutrients, improve soil health, and allow for earlier spring vegetable planting.

Winter-killed cover crops that are late summer and fall planted include spring oats, several mustard species, and forage and oilseed radish. Earlier planted summer annuals (millets; sorghums, sudangrasses, and hybrids; annual legumes such as sun hemp or forage soybeans; buckwheat and many others) can also be used as winter killed species. Timing of planting will vary according to the species being used and winter killed species selection will depend on when fields will be available for seeding. Summer annuals should be planted in late July or during August for use in a winter killed system to obtain sufficient growth.

Spring oats and mustard species can be planted from late August through September. For best effect, forage and oilseed radishes should be planted before the middle of September. Spring oats, radishes and mustards are not suited for October or later planting because they will not produce adequate fall growth.

All of the winter killed non-legumes mentioned above will benefit from the addition of 30-60 lbs of nitrogen.

The following are several options for using winter killed-species with vegetables:

Compaction mitigation for spring planted vegetables

Forage radishes have worked very well as a winter-killed cover crop in fields with soil compaction. The extremely large taproot penetrates deep into the soil, and after winterkilling, will leave a large hole where future crop roots can grow. Oilseed radish also provides considerable "biodrilling". Winter killed

radish cover works well with spring planted crops such as spinach, peas, early sweet corn, and early snap beans. One issue with radishes is that in mild winters they may not fully winter kill.

Soil health benefits for early planted vegetables

A wide range of early planted vegetables may benefit from winter killed cover crops. For example, peas no-till planted or planted using limited vertical tillage after a winter killed cover crop of forage radish, oilseed radish, or winter killed mustard have performed better than those planted after conventional tillage. Early sweet corn also has potential in these systems as do a wide range of spring vegetables including spinach, potatoes, and cabbage. Winter killed radishes and mustards also have the advantage of outcompeting winter annual weeds leaving relatively weed free fields and also in recycling nutrients from the soil so that they are available in the spring for early crops (decomposition has already occurred).

Mixed systems with windbreaks for plasticulture

By planting planned plasticulture bed areas with winter killed cover crops and areas in-between with cereal rye you can gain the benefits of these soil improving cover crops and eliminate the need to make tillage strips early in the spring. The winter killed areas can be tilled just prior to laying plastic.

Bio-strip till

By drilling one row of forage or oilseed radish and other adjacent rows with rye or other small grains, you can create a biodrilled strip that winter kills and that can be no-till planted in the spring without the need for strip-till implements. This opens up dozens of options for strip tilling (seed or transplanted) spring vegetables.

Squash Vine Borers and Pumpkins - Jerry Brust, IPM Vegetable Specialist, University of Maryland; jbrust@umd.edu

On a recent visit to a farm I saw bright yellow leaves in a pumpkin field (Fig. 1) and wondered if this could be Cucurbit yellow vine decline that

was first seen two years ago. Upon closer inspection of the plants it was found to be an old nemesis of pumpkins and squash - the squash vine borer. Borer moths lay eggs mostly at the base of pumpkin and squash plants starting in late June and going through the first few weeks of July. Eggs hatch and borers quickly move their way into the base of the pumpkin stem where they feed inside the stem (Fig. 2) disrupting water and nutrient flow to the rest of the plant (Fig. 3). Insecticide sprays need to be directed to the base of the plant for several weeks. Usually the best method of control is a cultural one - rotation. Squash vine borers overwinter in the same field they fed in. Come next spring and summer they emerge and look for the nearest cucurbit field.



Figure 1. Pumpkins with bright yellow leaves damaged from squash vine borer

The question is how far away does the next field have to be from this year's? In this case the grower rotated to a field that was $\frac{1}{4}$ mile from their other pumpkin field that was lightly infested the year before with squash vine borer (there are no other pumpkin fields around this farm for at least 3 miles). I know growers often do not have enough land to rotate much further than a $\frac{1}{4}$ mile. Last year's field was not plowed or worked over the off-season or this spring so the overwintering pupae survived in large numbers and upon emergence were able to locate this year's pumpkin field. How much of a yield decrease will result from is unknown at this time, but plants with feeding signs at their base were marked and will be followed to harvest to see what the yield reduction is. The bottom line is: a $\frac{1}{4}$ mile is probably not far enough of a

rotation from even a lightly infested field and pumpkin fields that had even a light infestation of squash vine borer need to be worked in the fall and spring to destroy as many overwintering squash vine borers as possible.



Figure 2. Damage to the base of pumpkin plant from squash vine borer



Figure 3. Squash vine borer inside damaged pumpkin stem

Agronomic Crops

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

Sorghum

Continue scouting flowering to milk stage sorghum for corn earworm. Earworms generally have a 'bumpy' appearance, and in sorghum, a darker striping pattern. The head is orange. Fall armyworm may also be present in heads, and is generally considered to be equally damaging. Fall armyworm are usually gray, although lighter greenish color morphs can be found. Lighter color morphs usually have a dark spot on the side behind the thoracic true legs. The head has an inverted Y faint line and the last abdominal segment has 4 'dots' arranged in a square pattern. One worm per head is generally associated with a 5% yield loss. You can use this to determine an appropriate threshold. Thresholds are generally between 1 and 2 worms, but this can differ depending on control tactic, price of sorghum, and expected yield. Vial testing on this week's moths indicate near 50% survivorship. Pyrethroids may not provide adequate control by themselves. Use high rates and high pressure if going out with a sorghum head spray.

Soybean

Corn earworm is active in fields. Be sure to scout double crop fields, open canopied fields, and dry pivot corners the next 3 weeks. Vial testing results on moths indicate near 50% survivorship, indicating a risk that a pyrethroid alone may not provide satisfactory control. If a pyrethroid is applied, be sure to follow up scout a couple of days later to determine efficacy. Stink bugs are also active and are pests up until beans reach later R6 stages. Thresholds are 5 per 15 sweeps, however, if a field is 3 or more, follow up scouting is going to be important, particularly in taller soybean fields. Stink bugs move throughout the canopy and can move deep enough that they may not be captured in a sweep net. Finally, soybean loopers are now active in Virginia. I expect to start seeing moths in our area soon. Generally, the final week of August to the second week of September is when soybean looper populations peak.

Soybean Disease Update - Alyssa Koehler, *Extension Field Crops Pathologist*; akoehler@udel.edu

The rain and high humidity this week have favored some foliar disease development. Grey Leaf Spot (GLS) is showing up in late-planted corn. In corn that is already past R3, foliar lesions that move in should not significantly influence yield potential. If you have corn at VT/R1 and over 50% of plants have lesions on the third leaf below the ear leaf or higher, a fungicide may be considered depending on the expected yield potential of the field, cost of application, and grain prices. The humid evenings have led to some downy mildew in soybeans. Downy mildew appears as pale-green to light yellow spots that can turn brown to dark brown as they mature (Figure 1). The underside of leaves are covered with tufts of pale to grey sporangiophores (Figure 2). This disease does not typically influence yield. Continue to monitor the weather and scout for foliar diseases like frogeye leaf spot through R5 if you are considering a fungicide application. If disease pressure is low or plants are beyond R5, a fungicide application may not be economical.



A Koehler, University of Delaware
Figure 1. Downy Mildew on Soybean



A Koehler, University of Delaware

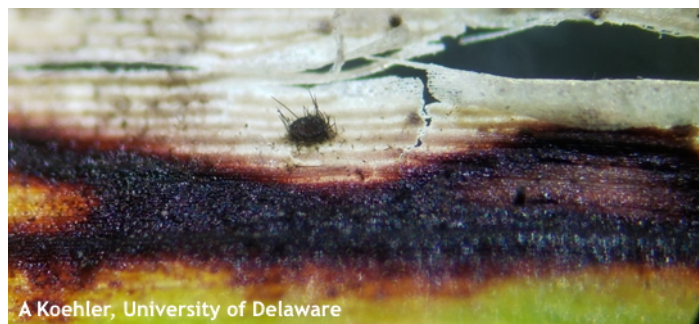
Figure 2. Underside of a soybean leaf with Downy Mildew

Diseases in Sorghum - Alyssa Koehler,
Extension Field Crops Pathologist;
akoehler@udel.edu

A broad range of diseases can affect sorghum. Over the course of the season, root rots, foliar pathogens, stalk rots, and head molds can all impact yield potential. Foliar diseases have been showing up in fields over the past few weeks. Host maturity, environment, and multiple diseases on the same leaf can complicate correct identification and diagnosis. In addition, different sorghum lines may respond to disease with different physiological reactions (red, purple, or tan colors). One of the most common foliar diseases in our area is Sorghum Anthracnose caused by *Colletotrichum* spp. Symptoms include red to tan lesions on the leaves or stems, stalk rot, or grain infection. Fungal structures resembling pincushions (acervuli with setae) can be observed within the lesion with the aid of a hand lens or other magnification (Figure 1). In susceptible lines, yield loss of up to 50% has been reported. Resistant hybrids, seed treatments, and fungicides can be used to try to manage this disease. Work out of Virginia Tech has shown that fungicides (Priaxor or Headline) were most effective at protecting yield in diseased fields when applied at flowering. Each percent increase of anthracnose disease severity can account for 0.5-1.25 bu/ac of lost yield potential

(<https://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-10-18-1867-RE>). As a field approaches flowering, if disease is absent or low, a fungicide application may not be profitable.

After grain fill, head molds become another concern. Head molds can cause pre- and post-harvest damage, reduce yield, and some of the fungi infecting the grain may form mycotoxins that can lead to quality issues. Chemical control of head mold fungi is typically not effective, insect control may be a better target since head molds are often associated with insect damage. Keeping mature grain from getting wet also helps to reduce head mold issues, but this can be a challenge depending on environmental conditions near the time of harvest. Hybrids are available that vary in susceptibility to anthracnose and head molds. Selecting moderately resistant lines over susceptible or very susceptible lines can help to reduce yield loss and mycotoxin contamination.



A Koehler, University of Delaware

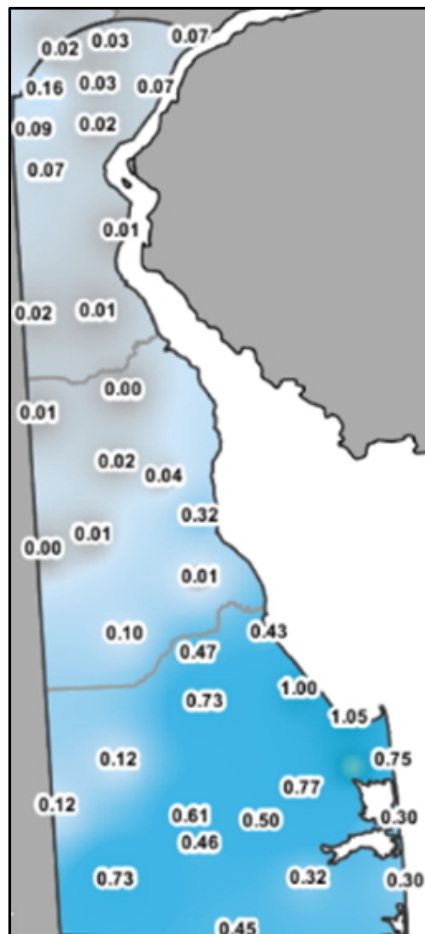
Figure 1. Sorghum Anthracnose lesion magnified to view fungal structures

General

Irrigation Management: Rain for Sussex, Scattered Showers for Others - James Adkins, Agricultural Engineer; adkins@udel.edu

Tuesday afternoon brought rain to most of Sussex County while spotty showers provided relief to some northern areas on Wednesday. Those who received profile filling rains (100% of available water) will have 5-6 days before irrigation will be needed for corn and 4-5 days for soybean. Full season corn is nearing black layer and the daily water usage is starting to fall from the 0.25+ "/day peak into a more manageable 0.13 "/day average. Full season soybeans are still using considerable water but

not nearly as heavily as past weeks. Soybean water use will continue until the leaves start to yellow.



24 Hour Rainfall Totals for Tuesday 8/13

The information presented below is an example of the soil moisture status at University of Delaware's Warrington Irrigation Research Farm. Actual field values will vary greatly depending on crop stage, soil type and local rainfall. There are many tools available that provide field by field values to assist farmers in making irrigation scheduling decisions including paid services through local crop consultants, irrigation equipment manufacturer's, Climate Corp, etc and free tools like KanSched and the Delaware Irrigation Management System (DIMS) <http://dims.deos.udel.edu/>

Field Corn

Daily corn evapotranspiration (ET) rates for April 25th planted 114 day corn at R4 averaged 0.13"/day for the past week. This field received 1.48" of rain in 2 events on Tuesday and Wednesday and 0.6" of irrigation on Sunday. This field is predicted to use 0.12", 0.14", 0.16", 0.16", 0.14" for Friday 8-16 - Tuesday 8-20 for an estimated daily usage of 0.14" per day for the upcoming week. These are estimated values and are no substitute for daily ET use models and field level soil moisture data.

At this point in the growing season most corn fields are at least into the R4 stage. UD research on when irrigation can be stopped has been largely inconclusive. Farmers should continue to irrigate until black layer. We have no data to suggest that irrigation after black layer has yield or test weight benefits.

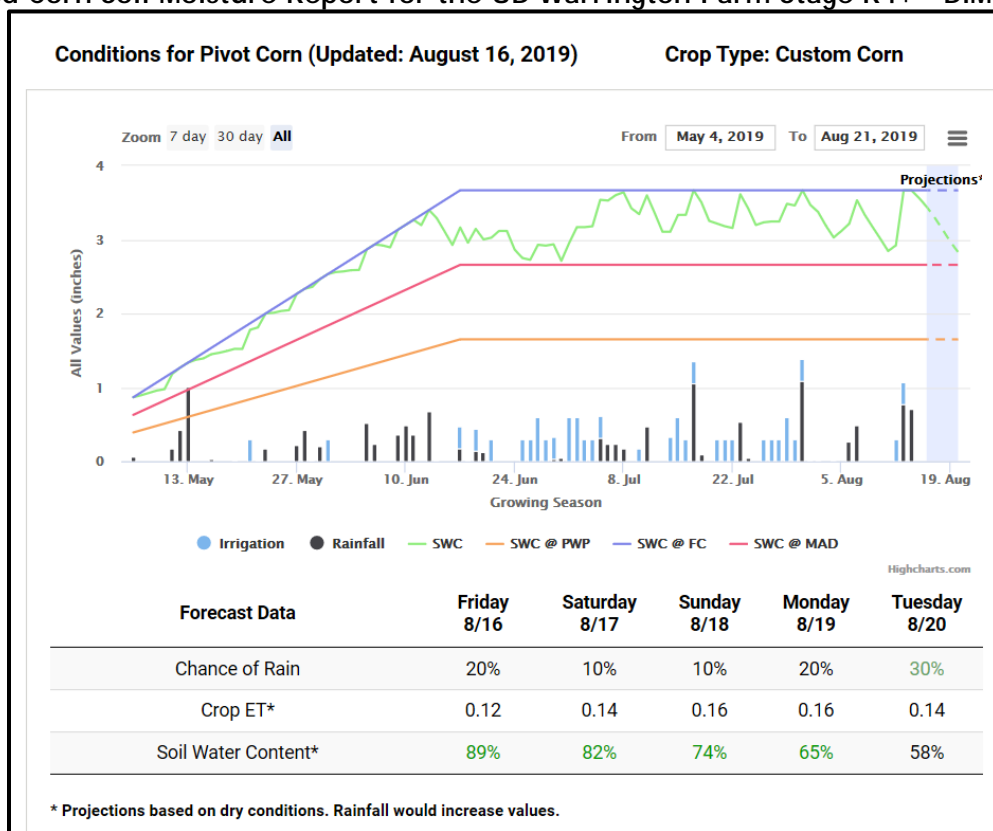
Full Season Soybeans

May 2nd planted soybeans at the UD Warrington Irrigation Research Farm are into the R5 stage as of Aug 16th. The average daily crop water use for the past week was 0.16" per day and the predicted daily ET for next week is 0.20" per day. Despite the profile filling rain event(s) on Tuesday and Wednesday, this field will require irrigation on Sunday. We have observed high rate of water use from the shallow profile; Remember to irrigate in small but frequent doses to avoid pushing water beyond the root zone. Multiple years of soil moisture sensor data show so use water primarily from the shallow (0-8") soil profile.

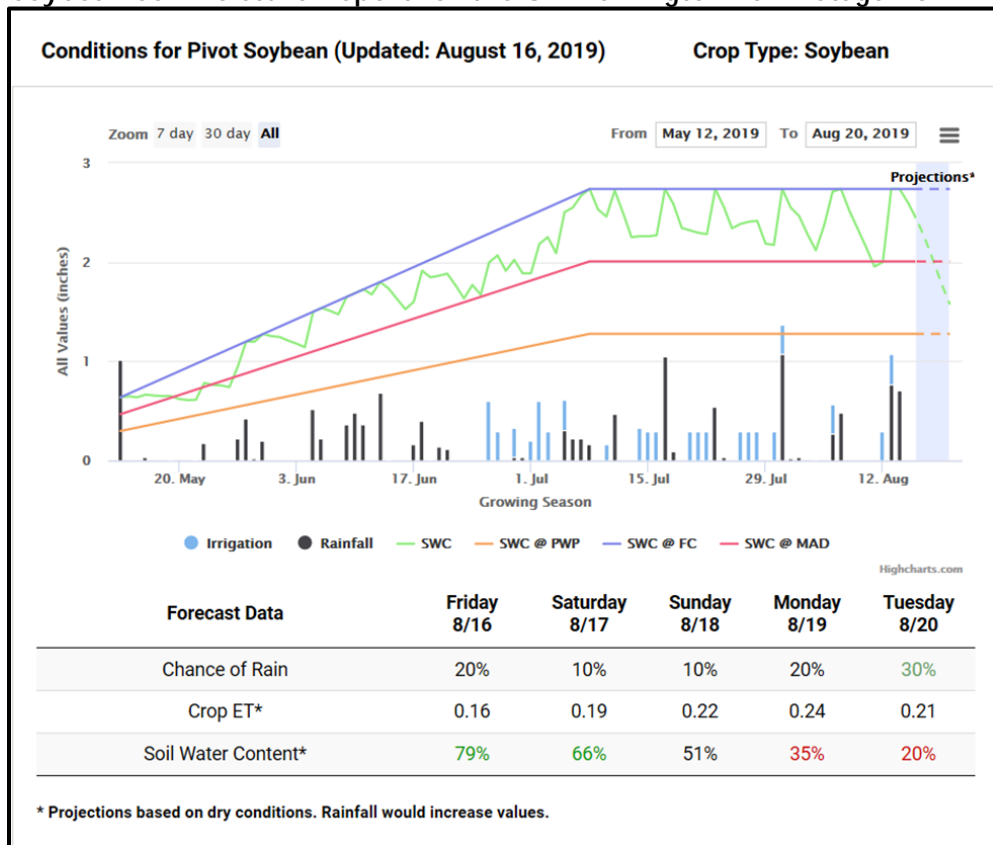
Double Crop/Late Season Soybeans

At this point double crop soybeans have full canopied. Once full canopy is achieved, late soybeans will use the same amount of water as the full season beans above.

Irrigated Corn Soil Moisture Report for the UD Warrington Farm Stage R4+ - DIMS Report



Irrigated Soybean Soil Moisture Report for the UD Warrington Farm Stage R5 - DIMS Report



Rogueing Palmer Amaranth - Jake Jones,
Extension Agriculture Agent, Kent County;
jjones@udel.edu

At this point in the growing season, the success of your herbicide program becomes apparent. Timing is vital to controlling Palmer amaranth and killing plants above the canopy with herbicides is nearly impossible. The key is to spray Palmer amaranth when the plants are under 3 inches tall. So what should you do when the plants are 5, 6, 7 feet tall? If the infestation isn't too severe, hand rogueing is the best option to reduce next year's seed bank. After a rain/irrigation you should pull the Palmer amaranth plants up by the roots and remove them from the field. If they are laid back in the field they can re-root and continue growing. Once they are out of the field, composting the plants is one option and will kill the seeds as a result of temperatures between 131-170°F. Burning is another option, but the ban on open burning during ozone season (May 1-September 30) prevents this disposal method, unless it is an emergency, until October 1. Once the first round of Palmer amaranth plants are rogued, you should continue to monitor those fields for smaller plants that emerge from the soybean canopy later and repeat the process.

Fields that you know have Palmer amaranth, and infested areas within those fields, should be harvested last to limit the spread of this noxious weed. Equipment sanitation is important to limit Palmer amaranth spread from field-to-field. Used compressed air to clean combines from the top down and then run 2-3 bales of straw through the combine (clean-out video: <https://integratedweedmanagement.org/index.php/2019/03/20/the-straw-bale-methodology-for-cleaning-weed-seeds-out-of-a-combine/>). Considerations for infested fields next year include: crop rotation, in order to utilize different herbicides and the use of residual herbicides in your spray program.

Hand rogueing is not fast or easy work but is an investment that will pay off in the years to come.



A golden opportunity to prevent future expense and aggravation.

Guess the Pest! Weeks 18 & 19 - David
Owens, Extension Entomologist,
owensd@udel.edu

Test your pest management knowledge by clicking on the GUESS THE PEST logo and submitting your best guess. For the 2019 season, we will have an "end of season" raffle for a \$100.00 gift card. Each week, one lucky winner will also be selected for a prize and have their name entered not once but five times into the end of season raffle. A lucky winner will also receive a heavy duty sweep net.

Sorghum is a relatively minor field crop for us, and yield limiting disease incidences are less predictable than farther south, making GTP 18 a bit of a challenge. Folks can continue responding to GTP 18 this week or try your hand with the second challenge below.

GTP 18: What is causing the leaf discoloration on this sorghum?



D Owens, University of Delaware

GTP 19: This week, we have another timely critter for which sweep nets are an ideal scouting tool. What is this elusive insect?



A Koehler, University of Delaware

To submit your answer(s), please go to:
https://docs.google.com/forms/d/e/1FAIpQLSfUPYLZnTRsol46hXmggj8fvt5f8-JI0eEUHb3QJaNDLG_4kq/viewform



Announcements

Open House at UD's Genaurdi Food Innovation Lab

Wednesday, August 21, 2019 6:00-8:00 p.m.
Genaurdi Food Innovation Lab
529 S. College Ave. Newark, DE.

We welcome you to visit our Open House and learn how Cooperative Extension and the UDairy Creamery are partnering to offer seminars in Value-Added Dairy and Agriculture Products.

While you visit, please take the opportunity to tell us your interests and needs by filling out our survey. Some future sessions include Food Safety Planning, Pasteurization, Marketing your Ag Product, Cheese Fermentation & more!

- Let us know how we can assist you & your interest in value-added agriculture & dairy products.
- Explore the Genaurdi Food Innovation lab and the UDairy Creamery production facilities
- Learn about new educational opportunities and seminars coming up in the future

Light refreshments and UDairy Creamery product samples available.

To RSVP, please email mlit@udel.edu or call 302-831-1364

Please park behind Townsend Hall and enter through the rear entrance of Worrilow Hall. 529 S. College Ave. Newark, DE.

This institution is an equal opportunity provider. If you have special needs that need to be accommodated, please contact the office two weeks prior to the event.

Upcoming MidAtlantic Women in Ag Events

Fall Farm Tour - September 4

Laurel Farmers Auction Market ▪ Covered Bridge Inn
Historic Farmhouse and Wedding Venue ▪ Hopkins
Farm Creamery ▪ Dogfish Head Brewery

<https://www.extension.umd.edu/womeninag/farm-tours-0>

Wednesday Webinars

<https://www.extension.umd.edu/womeninag/webinars>

Women in Ag Conference – save the dates Feb 12 & 13, 2020

<https://www.extension.umd.edu/womeninag/annual-conference/2020-conference>

Cut Flowers 2: Advanced Annuals, Post-Harvest Handling & Season Extension

Saturday, September 28, 2019 1:00–4:00 p.m.

Masterpiece Flower Farm

7945 Old Ocean City Road, Whaleyville, MD 21872

Join us at Masterpiece Flower Farm and learn how to grow advanced annuals such as Dahlias, Ranunculus, and Lisianthus. Special focus will be given to post-harvest handling practices. We will also discuss tips for season extension. All experience levels are welcome. (Rain Date: September 29th, same time, same place.)

This workshop will be led by farmer/owner Crystal Giesey, who is deeply committed to growing flowers sustainably and organically. Thanks to Crystal and to the organizers Future Harvest CASA and the University of Delaware.

<https://www.eventbrite.com/e/cut-flowers-2-advanced-annuals-post-harvest-handling-season-extension-tickets-64194508503>

Small Ruminant Field Day: Nutrition for Productive and Efficient Sheep and Goat Farms

Saturday, September 14, 2019

8:45 a.m.-3:00 p.m.

DSU's Hickory Hill Farm

2065 Seven Hickories Rd, Dover, DE 19904

TOPICS

- Basic nutrition for raising production sheep and goats
- Pregnancy and kidding nutrition
- Raising animals on pasture

HANDS ON DEMONSTRATIONS

- Pearson Square
- Grinding and Mixing Feed Ration
- Body Condition Scoring
- Evaluating Hay

KEY PRESENTERS

Susan Schoenian

Sheep and Goat Specialist, University of Maryland Extension

Amanda Grev

Extension Specialist, Pasture Management for Livestock Operation, University of Maryland Extension

Cost is \$15 per person! Lunch is included.

Last day to register is September 7, 2019. Register online at: <https://www.eventbrite.com/e/small-ruminant-field-day-tickets-68734886897>

For more information, to register, or for assistance due to disabilities contact:

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Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of August 8 to August 14, 2019

Readings Taken from Midnight to Midnight

Rainfall:

0.61 inch: August 13

Air Temperature:

Highs ranged from 88°F on August 8, August 9 and August 14 to 82°F on August 10.

Lows ranged from 72°F on August 14 and 59°F on August 12.

Soil Temperature:

78.9°F average

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

*Weekly Crop Update is compiled and edited by
Emmalea Ernest, Associate Scientist - Vegetable
Crops*

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