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

Seedcorn Maggot

According to degree day models, adult seedcorn maggot emergence from the soil peaked around March 21 in Georgetown, DE. On warm, sunny days adults can be seen resting on soil surface, particularly freshly disturbed soils. We recently recorded a YouTube video discussing seedcorn maggot which can be accessed here: https://www.youtube.com/watch?v=nDhj8QTz8hw.

Greenhouse Pests

Scout greenhouse transplants for aphids and spider mites. Destroy any weeds growing in the greenhouse to prevent mites from establishing on them and then moving onto transplants.

Freeze Damage to Peas

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

Some pea fields were planted in early March and may be susceptible to freeze damage over the next several weeks.

Peas are very cold hardy and can tolerate freezing temperatures down to the low 20s. Lower temperatures (below 20˚F) or a combination of high winds (gusts over 30 mph) and freezing temperatures (below 25˚F) can cause damage to pea plants, sometimes killing them to soil level. Peas that are germinating or just cracking the ground will have little damage.

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

For peas, the more sensitive stage to freeze damage is flowering which usually occurs late enough in the spring to avoid freeze risk.

Scout for Allium Leafminer in Onions and Leeks Over the Next Few Weeks

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

If you grow leeks or onions or other *Allium* species, now and for the next few weeks is the time to watch for the tell-tale marks left by Allium leaf miner. Allium leaf miner *Phytomyza gymnostoma* tell-tale marks consist of many linear small white dots (made by the female's ovipositor) that appear in the middle towards the end of leaf blades (Fig. 1) of their preferred hosts of leeks, onions, garlic and other *Allium* species. Spring crops are usually not as hard hit as fall crops especially when looking at leeks, but this pest has been steadily increasing its geographical range each year and its damage potential. If you had some infestation last year you will especially want to be looking for the signs of this pest.

To go over recommendations for this pest:

New transplants or seedings of onions, leeks or garlic should be watched closely for the tell-tale signs of the fly's damage. When eggs hatch the larvae at first mine leaves (Fig. 2) and then move down to the bulbs and leaf sheathes where they feed and eventually pupate. Pupae will undergo a summer aestivation (type of hibernation because temperatures are too warm for them to be active) and only emerge again in late September. You can cover any just-transplanted *Allium* planting with a row cover (but don't wait too long after transplanting) to keep the flies off or, if needed, treat with insecticides. Research out of Cornell University has found using just two applications of spinosad (Entrust, which is OMRI-labelled) two weeks after oviposition marks are first found and then another application 2 weeks after this will give adequate control of the pest. But the oviposition marks must be watched for carefully and discovered very soon after first being made. A penetrant adjuvant also is recommended to be used when treating for the larvae.

Figure 1. Onion leaf blade showing linear white dots made by female Allium leaf miners

Figure 2. Allium leaf miner larva mining in onion

Shade Cloth for Lettuce Production

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In Delaware, spring lettuce is planted in March and April. Head lettuce should be seeded in March and transplanted by mid-April. Leaf lettuce can be direct seeded in March and April. Lettuce is a cool season crop that grows best at temperatures of 59-68 °F. Temperatures of around 85 °F promote bolting (flower stalk formation) and development of bitter flavor. Some lettuce varieties are less prone to bolting and bitterness when exposed to heat. Heat tolerance information is listed in some seed catalogs and varieties that have shown heat tolerance in Mid-Atlantic trials are indicated in lettuce section of the Mid-Atlantic Commercial Vegetable Recommendations. Because of the high likelihood of temperatures in the 80s during the spring lettuce season, heat tolerant varieties are recommended for Delaware production, especially for later season plantings.

Besides heat tolerant varieties, shade cloth is another tool that can be used to protect lettuce crops from quality loss due to heat stress. In 2018 and 2019 shading experiments were conducted in spring-planted lettuce at the University of Delaware's research farm in Georgetown, DE. The trials were transplanted on April 12, 2018 and April 10, 2019 and shade was applied on May 4 in 2018 and on May 20 in 2019. These experiments were designed to answer several questions:

Can shading reduce bolting and bitterness in spring lettuce?
Overall, shading reduced bitter flavor in both years. Shade cloth effect on bolting was more complicated, with shade cloth increasing bolting in heat sensitive varieties.

Are certain shade cloth colors more effective?
Black 30% shade cloth was the most effective at reducing bitterness. The other shade cloth colors tested were blue 30%, red 30%, silver 30%, white 40%, and white 22%.

How does shading work in combination with heat tolerant varieties?
Four varieties were used for the experiment: two romaine varieties, Arroyo (heat tolerant) and Salvius, and two butterhead varieties, Skyphos (heat tolerant) and Alkindus. Shading was most impactful on the flavor of the heat tolerant romaine variety Arroyo. In both years Arroyo had a marketable bitterness rating with black 30 % shade and an unmarketable rating without shade. The other romaine variety did not have a marketable bitterness rating in any treatment in either year although shading did reduce the bitterness ratings in both years. For the butterhead varieties, Skyphos, the heat

tolerant butterhead, had marketable bitterness ratings with and without shade and shade did not reduce the bitterness rating. The heat susceptible butterhead had slightly lower bitterness ratings with black 30% shade compared to no shade and the shade treatment averaged in the marketable range, whereas the no shade treatment averaged unmarketable.

Average 2018 and 2019 Bitterness Ratings for the 30% Black and No Shade Treatments*

	30% Black	No Shade
Arroyo	1.6	2.8
Salvius	3.0	3.5
Skyphos	1.3	1.3
Alkindus	1.9	2.1

*Bitterness Ratings <2 are considered marketable.

How did shade impact soil and plant temperatures?
The soil and leaf temperatures were lower in the 30% back shade treatment on both hot days and on cooler days. Average soil and leaf temperatures for no shade and the 30% black shade treatments are shown in the table below.

	Soil Temp		Leaf Temp	
Weather Conditions *Air Temp*	Sunny Calm *90 °F*	Sunny Breezy *71 °F*	Sunny Calm *89 °F*	Sunny Breezy *71 °F*
30% Black Shade	82 °F	75 °F	78 °F	71 °F
No Shade	88 °F	82 °F	81 °F	81 °F

Shade Cloth Implementation
The lettuce shade experiments showed that shading can reduce bitterness and maintain marketable quality, especially in certain varieties. In a field setting, shade cloth can be applied over low tunnels or larger structures to create "shade houses". In the experiments described the shade cloth was draped over pepper stakes and secured to the ground with landscape staples. Shade cloth can also be used to cover high tunnels where heat sensitive crops are being produced.

The 2018 lettuce shade trial on May 16.

Fruit Crops

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

There were several advective freeze events this past week when freezing temperatures occurred along with high winds. Lows for the early morning on March 29 ranged from 22-26 °F and wind gusts over the period were over 30 mph. Cold damage in stone fruits is of concern because many trees are flowering, two weeks ahead of normal.

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

Over 50% of open plum flowers will have been killed by the recent advective freezes

Nectarine blooms in first pink stage may have had minor losses (10%)

Strawberries
Fortunately, plasticulture strawberries were still under row covers that will, depending on weight, protect down to 24˚F. For strawberries the critical temperature during bloom at the blossom level is 28˚F. Below 28˚F, there is a progressively higher risk of flower damage, and below 26˚F most blooms will be damaged or killed. Flowers that are not open and just emerging from the crown can tolerate temperatures down to 22˚F and once fruit has formed temperatures down to 26˚F can be tolerated for short periods of time. Flower acclimation is also important. Plants with flowers exposed to several cold days before a freeze will be more tolerant than those exposed to warm days before. For strawberries, two layers of floating row covers may be the most effective strategy for advective freezes. Double covers have been shown to be more effective than single heavy covers in this case.

Agronomic Crops

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

Alfalfa
If you have not yet begun scouting for alfalfa weevil damage, do so NOW. Alfalfa weevil began hatching a couple of weeks ago from eggs laid in the fall, and I have visited several fields that are well above threshold. The timing of this hatch is a couple of weeks earlier than 2021. Adult weevils are still active, continuing to lay eggs, thus we will have an extended period of weevil larval activity. There is a dynamic threshold based on plant height, control costs, and alfalfa value in our recommendation guide: https://www.udel.edu/content/dam/udelImages/canr/pdfs/extension/sustainable-agriculture/pest-management/Insect_Control_in_Alfalfa_-2020_-_David_Owens.pdf. To sample alfalfa, select thirty stems per field and beat them into a bucket. You may wish to examine the stems after beating because early instar larvae sometimes do not easily dislodge from their hiding places in the folded terminal leaflets. Please also note that thresholds are for pure stands only. There are no thresholds once the alfalfa component of a mixed stand drops below 50%.

Alerts and Apps
I recorded a brief Pest Patrol text alert when we saw the first larval activity. Pest Patrol is a free service sponsored by Syngenta. Users sign up to receive alerts for various crops/regions and when a regional specialist records a message, the system sends a text notification on your phone that links to the 2-5 minute recording. You can find more information here: https://www.syngenta-us.com/pest-patrol.

The MyIPM app for row crops is now live! Check it out!

Early Season Moth Trapping

We have begun monitoring true armyworm and black cutworm. Moth flight from both species before last weekend's cold snap was starting to increase to levels that are a couple of weeks earlier than 2021. However, with cold weather this week, flight has decreased. Many thanks to Morgan Malone and Joanne Whalen for checking traps.

Location	# of Nights	Total Catch	
		TAW	BCW
Willards, MD	7	8	6
Laurel, DE	7	33	8
Seaford, DE	7	8	12
Sudlersville, MD	7 (3/25)	0	3
Harrington, DE	7	52	16
Smyrna, DE	8	46	17
Middletown, DE	8	3	15

Cover Crop Biomass and Termination Considerations

- *Jarrod O. Miller, Extension Agronomist*, jarrod@udel.edu; *Amy Shober, Extension Nutrient Management and Environmental Quality Specialist*; ashober@udel.edu and *Mark VanGessel, Extension Weed Specialist*; mjv@udel.edu

The benefits of cover crops to the following corn crop can include additional nitrogen (N) or weed suppression, but maximizing these benefits requires later termination to build greater biomass. These N and weed control characteristics are especially appealing this season as input costs are relatively high while supplies are relatively low. However, growers should take the time to estimate the additional costs of allowing a more robust cover crop to accumulate this spring, as surface residues reduce proper seed placement as well as limit seed to soil contact. This article will discuss the management of cover crops for both maximizing N benefits as well as weed suppression in the following corn crop.

Maximizing Nitrogen Benefits

Estimating the amount of N that could be available requires knowledge about 1) total cover crop biomass and 2) cover crop C:N ratio, both of which are affected by termination timing. The longer a cover crop is allowed to grow, the greater the amount of cover crop biomass will accumulate. For an NRCS-sponsored research project, we grew rye and rye mixed with clover and vetch for three seasons (Figure 1) in small plots at the Carvel Research Center in Georgetown, DE with two termination timings: 1) two weeks prior (early) to corn planting and 2) at corn planting (late). The later burndown at planting is also known as "**planting green**". The later termination of rye (yellow), rye/clover (blue), rye/vetch (green) allowed for more cover crop growth and associated biomass (Figure 1). In some cases, cover crop biomass doubled by waiting two weeks, as evidenced with the rye/clover mix in 2019. The 2019 rye/clover biomass was 3 Mg/ha (3.3 ton/ac) at early termination compared to nearly 7 Mg/ha (7.7 ton/ac) when terminated late. In 2021, the rye biomass nearly tripled in total weight with late termination to nearly 6 Mg/ha (6.6 ton/ac) when compared to the 2 Mg/ha (2.2 ton/ac) at early termination. While we consistently saw biomass bumps from later termination in any given year, we also saw a large difference in total biomass across all study years. For example, cover crops planted in 2020 benefited from a much warmer winter which allowed for much greater biomass production.

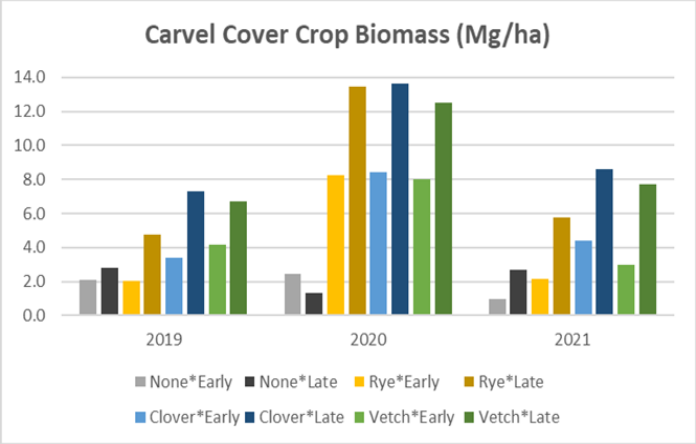

Figure 1. Total biomass (by weight) in Megagrams per hectare of no cover (gray), rye (yellow), rye/clover (blue), and rye/vetch (green) mixes from 2019-2021. Early termination is depicted by the lighter colored bars and late termination by the darker bars. Note that 1 Mg/ha is equivalent to 1.1 tons/ac.

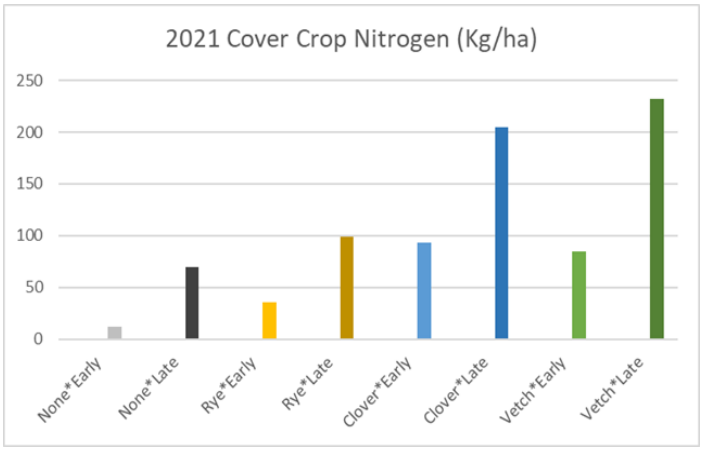

Figure 2. Total nitrogen (by weight per hectare) in the no cover (gray), rye (yellow), rye/clover (blue), and rye/vetch (green) plots for 2021. [1 kg/ha = 0.89 lbs/acre]

As total biomass, or weight, of cover crops increases, more N also accumulates in the biomass, regardless of the species (Figure 2). Even the weeds that germinated in the no-cover plots accumulated more total N with greater biomass. Mixes containing rye and legumes (i.e., clover and vetch) had a higher concentration of total N than rye, as these legumes can fix atmospheric nitrogen. As such, the mixes contained significantly more total N in the biomass, especially with later termination (Figure 2). For example, the total N content (2021 season) of the late terminated rye/clover mix was almost 200 kg/ha (178 lbs/acre), while the total N content of the late terminated rye/vetch mix was roughly 225 kg/ha (200 lb/ac); both these late terminated cover crop had more the double the total N content of their early terminated counterparts. However, we still need to consider the potential for this cover crop N to be available to the corn crop that will be planted behind it.

While total N in the cover crop is important, we must consider that not all that total N will be available to the subsequent corn crop during the growing season due to the carbon (C) to N ratio (C:N ratio) of the cover crop biomass (Figure 3). As cover crops mature (or any crop for that matter), they accumulate more C compared to N and the C:N ratio increases. In general, residues with a C:N ratio less than 20 (20 parts C to 1 part N; black line Figure 3) will release N to the soil (mineralization), while biomass with a C:N ratio above 30 (red line, Figure 3) is more likely to tie N up in the soil (immobilization). The biomass of cereal crops, like wheat and rye, will typically have a C:N ratio that is higher than 30 once the crop matures past the flag leaf or pre-boot state (Feekes 8) because there is more stem than leaf biomass present past this stage. While rye is preferred as a cover crop for its ability to scavenge N from the soil over the winter, allowing for later termination of a rye cover crop can ultimately result in residue with N that will not quickly mineralize to supply N to the subsequent cash crop. This was the case for the late-terminated rye cover in 2020, where waiting two additional weeks to terminate the crop resulted in the C:N ratio rising above 30, so the biomass was less likely to release any N to the soil early in the corn season (Figure 3). However, we did not see the same trend in biomass C:N ratio for late-terminated rye in 2021, because plots were terminated a bit earlier in the season before rye had reached the flagleaf stage. The good news was that planting a legume with rye

resulted in an increase in total biomass N while biomass C:N ratios remained below 20.

Choosing termination timing this spring is more difficult due the higher costs of both fertilizer and herbicides adding to management decisions. Our typical factors of field conditions, managing cover crop residues when planting, and slug pressure remain in play as well. Ultimately the decision is up to each operator, but keep in mind the results of this local cover crop N study if you may be looking to lower fertilizer costs.

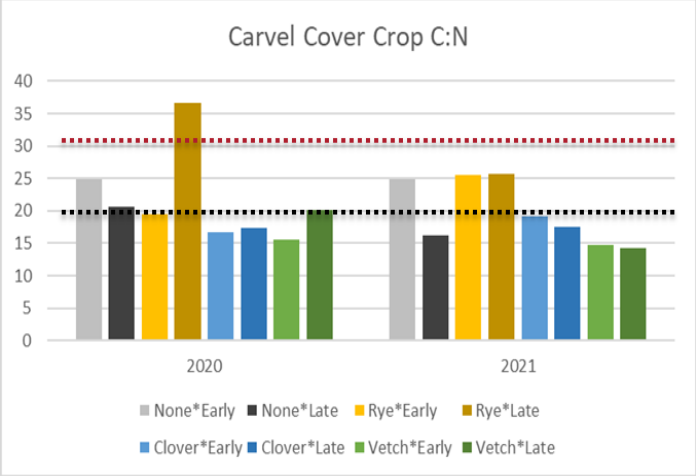

Figure 3. The carbon to nitrogen (C:N) ratio of no cover (gray), rye (yellow), rye/clover (blue), and rye/vetch (green) mixes in 2020 and 2021.

Burndown Herbicide Rates and Maximizing Weed Suppression

Weed suppression is most effective when cover crops have >5 Mg/ha (5.5 tons/ac, Finney et al., 2016), which was achieved in all cover crop plots in 2020 and late terminated rye/legume mixtures in 2019 and 2021 (Figure 1). Similar to total available N, more biomass is better in this case, and terminating cover crops later into April or early May is the best way to achieve this.

Another consideration in weed suppression could be the C:N ratio. While a high cover crop C:N is not ideal for providing N to the following corn crop, it will slow the breakdown of the cover crop residues. The longer those residues remain in the field, the more mulch they can provide, shading out potential weed growth. In this case, rye is the most likely candidate to remain in the field, having the highest C:N compared to most other treatments (Figure 3).

All weed management decisions will overlap with burndown considerations. While cover crop biomass is lower earlier in the spring, you may be considering saving money and lowering the rate. However, weather and environmental conditions may not be ideal for plant susceptibility or herbicide efficacy. The full rate is also needed when planting green, particularly if cereals are at the boot stage, to make sure no plant survives. Another potential situation would be poor cover crop performance, so that even if you terminate later, reduced biomass allows some weeds to germinate in the spring. In this case you would still need the full rate to kill both the cover crop and any germinating weeds.

Final Thoughts and Effects on Yields

We only observed reduced corn stands during one season with late termination, but did observe slightly lower corn yields in two out of three years with late termination. While the full rate of herbicide should be used no matter when you terminate the cover crop, later termination may reduce weed germination and save you on applications during the corn growing season. Later termination of any stand mixed with a legume can certainly provide an additional amount of N to the corn crop, most likely around the maximum growth period (corn V6), and adjustments could be made on the expected N contributions.

Finney, D.M., White, C.M. and Kaye, J.P. (2016), Biomass Production and Carbon/Nitrogen Ratio Influence Ecosystem Services from Cover Crop Mixtures. Agronomy Journal, 108: 39-52. https://doi.org/10.2134/agronj15.0182

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Fusarium Head Blight Management

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

Welcome back to the first weekly issue of 2022. Although temperatures the past few nights may slow us down some, small grains have been moving right along. It is never too early to start making a game plan for disease management. Fusarium Head Blight (FHB), caused by the

fungus *Fusarium*, is typically the most important disease of small grains in our region. Last year was one of the lowest disease pressure years that we have had recently. The weather over the next few weeks will determine how large our risk for this year will be. The Fusarium Risk Assessment Tool (www.wheatscab.psu.edu) is a forecasting model that uses current weather conditions and weather forecasts to predict FHB risk. Historically about 70% accurate, this tool aids in assessing FHB risk as wheat approaches flowering and fungicide application decisions are made. The pathogen that causes FHB infects through the flower and rainfall 7 to 10 days prior to flowering favors spore production and increases risk of infection. The model for 2022 is now live (Figure 1). Within the map you are able to look at predicted risk for the current day or 2,4, or 6 days out. You can click to adjust anticipated susceptibility based on the hybrid planted.

Figure 1. Fusarium Risk Assessment Tool screenshot of predicted risk from March 30, 2022, www.wheatscab.psu.edu

Fusarium species that cause FHB can infect both corn and small grains. Walking through fields with corn stubble, you may see orange growth on old debris (Figure 2). Since much of our small grain acreage is planted into corn fodder, FHB inoculum is maintained over winter. Wet spring conditions favor fungal sporulation that can lead to infected wheat or barley heads. As the fungus grows on corn fodder or other debris, spores are released that are then rain dispersed or moved through air currents. As the grain crop is flowering, spores land on the head or anthers, colonize these tissues, and move into the grain. Once inside the grain, water and nutrient movement is disrupted which results in the bleached florets we associate with FHB (Figure 3). Shriveled and wilted "tombstone" or "scabby" kernels can reduce yield and result in grain contaminated with mycotoxins (Figure 4). Deoxynivalenol (DON), also referred to as vomitoxin, is a health hazard to humans and animals. Wheat heads colonized later in development may not show dramatic symptoms but can still have elevated DON.

Figure 2. Corn stubble with Fusarium sporulation that can contribute to FHB in wheat.

Figure 3. Wheat heads showing bleached florets from FHB.

Figure 4. Healthy kernels (left) White, shriveled, scabby kernels from FHB (right).

Optimal wheat fungicide application is at early flowering (10.5.1) to about 5 days after. A well-timed fungicide application can help to reduce disease severity and DON levels. It is important to remember that fungicides help to reduce disease levels and DON (traditionally around 50% reduction on a susceptible variety), but they do not eliminate all FHB or DON. To try to maximize the efficacy of fungicides, it is important to apply at the correct timing. Fungicides for FHB are most effective when applied during flowering in wheat and at head emergence in barley. Although new products like Miravis Ace can be applied earlier, it is still best to wait for main tillers to be at 10.5.1 or a few days beyond, so that secondary tillers have a greater chance of being at 10.3-10.5.1. If you spray too early, heads that have not emerged will not be protected by the fungicide application. When wheat heads begin to flower, look for yellow anthers in the middle of the wheat head. When at least 50% of main stems are flowering, you will want to initiate fungicide applications. As the flowering period continues, anthers will emerge from the top and then the bottom of the wheat heads. Anthers can stay attached after flowering, but usually become a pale white (Figure 5). Triazole (FRAC group 3) fungicides that are effective on FHB include Caramba (metconazole), Proline (prothioconazole), and Prosaro (prothioconazole + tebuconazole). Miravis Ace (propiconazole + pydiflumetofen) offers a triazole + SDHI, FRAC group 7. There are also two new products on the market, Spharex (metconazole [3] + prothioconazole [3]) and Prosaro Pro (prothioconazole [3] + tebuconazole [3] + fluopyram [7]). As a reminder, fungicides containing strobilurins (QoI's, FRAC 11) should not be used past heading because these fungicides can result in elevated levels of DON. Flat fan nozzles pointed 90° down are great at covering foliage, but they do not provide as good of coverage on heads, which is the target for FHB management. Nozzles that are angled forward 30-45° down from horizontal (30 degrees is better than 45) or dual nozzles angled both forward and backward give better contact with the head and increase fungicide efficacy. For ground sprays, fungicides should be applied in at least 10 gallons of water per acre. Results from 2021 fungicide trials are included. 2021 was a very low pressure disease year, FHB was almost nonexistent and glume blotch levels were much lower than previous seasons.

Figure 5: From left to right Feekes 10.3, Anthesis, Feekes 10.5.1 (yellow anthers beginning flowering), 4 days after anthesis (white anthers post flowering).

Thinking beyond this season, an integrated approach can improve management of FHB and help to keep DON levels low. In your field rotation plan, if you have soybean fields that can be harvested early enough for a timely wheat or malting barley planting, this rotation helps to reduce the amount of pathogen overwintering and starting the season. In addition to rotation considerations, seed selection is another important piece of FHB management in wheat. There is no complete host resistance against FHB, but you can select wheat varieties with partial resistance. The University of Maryland sets up a misted nursery to compare FHB index and DON levels across local wheat varieties under very high disease pressure to aid in variety selection decisions (https://cpb-us-e1.wpmucdn.com/blog.umd.edu/dist/a/434/files/2021/07/2021-MD-wheat-varieties-disease-and-yield.pdf).

2021 Wheat Fungicide Timing Trial

Treatment	Yield (Bu/A)[z]	GB % Flag Leaf Incidence[y]	GB % Flag Leaf Severity	FHB % Incidence[x]	FHB % Severity[w]	GB % Incidence	GB % Severity
Control	92.8 g	1.0 a	9.9 a	0.08	0.31 a	1.0 a	11.4 a
Prosaro anthesis[v]	98.4 cd	1.0 a	2.4 c	0.05	0.18 b	1.0 a	9.2 c
Caramba anthesis	95.4 f	0.96 ab	1.43 de	0	0 e	1.0 a	10.1 b
Miravis Ace 10.3	99.9 bc	0.04 de	0.04 f	0.07	0.17 b	0.27 c	0.41 f
Miravis Ace anthesis	100.5 b	0.08 d	0.08 f	0.05	0.08 c	0.12 e	0.17 f
Miravis Ace 5 days after anthesis	102.9 a	0.02 e	0.01 f	0.02	0.04 cde	0.2 d	0.27 f
Prosaro PRO 10.3	96.6 def	0.9 c	3.4 b	0.03	0.04 cde	1.0 a	11.06 a
Prosaro PRO anthesis	97.1 def	0.94 bc	2.7 c	0.01	0.01 de	0.95 b	5.77 e
Prosaro PRO 5 days after anthesis	96.8 def	0.94 bc	2.6 c	0.01	0.04 cde	0.99 a	6.25 e
Sphaerex anthesis	96.0 ef	0.92 bc	2.2 cd	0.06	0.17 b	1.0 a	9.77 bc
Sphaerex 5 days after anthesis	97.6 de	0.92 bc	1.4 e	0.03	0.09 c	1.0 a	7.3 d
p-value	0.03	0.0001	0.0001	0.1	0.02	0.0001	0.0001
LSD (α=0.05)	1.95	0.043	0.76	ns	0.06	0.03	0.66

[z] Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05). Yield adjusted to 13.8% Moisture. Variety: Shirley; Planting Population: 1.6 mil sd/a; Planting Date: 11/9/20; Harvest Date: 6/29/21

[y] Glume Blotch Incidence was visually assessed as the % of 10 flag leaves or heads per plot displaying symptoms

[x] Fusarium Head Blight Incidence was visually assessed as the % of 10 wheat heads per plot displaying symptoms, ns=not significant

[w] Fusarium Head Blight Severity was visually assessed as the average amount of symptoms present on 10 wheat heads per plot

[v] All fungicide treatments included the non-ionic surfactant Induce at 0.125% v/v

Audit 1:1 Herbicide Labeled for Postemergence Weed Control in Cereal Rye for Delaware – *Mark VanGessel, Extension Weed Specialist*; mjv@udel.edu

There are only handful of herbicides labeled for cereal rye. UPL has registered Audit 1:1 for postemergence applications. Audit 1:1 is a prepackaged mixture of thifensulfuron plus tribenuron at a 1:1 ratio. The rate is 0.6 to 1 oz/A and needs to be applied before the flag leaf is visible. Audit 1:1 can be tank mixed with other labeled herbicides. Audit 1:1 will control a number of broadleaf weeds, see label for more details.

Enlist One and Enlist Duo Labeled for 2022 – *Mark VanGessel, Extension Weed Specialist*; mjv@udel.edu

Enlist One and Enlist Duo, both containing 2,4-D choline, were approved for 2022 season. These are both labeled for application with Enlist soybeans. These were the first herbicides registered by EPA with a fuller integration of the Endangered Species Act which prevents the use in numerous counties throughout the US. However, none of the counties in DE or eastern Shore of Maryland were impacted. The application cutoff timing was changed to R1 (prebloom) to avoid applications when bees are visiting the fields. There is a required 30-foot downwind buffer to sensitive areas (refer to label for specific requirements). Applications must be made no less than 48 hours prior irrigation or rainfall. A new change is a required "Mitigation Measures" for runoff management. This is required for **ALL** fields treated with Enlist One and Enlist Duo. Mitigation Measures are on a credit system and the number of credits required depends on soil types. Refer to label for complete list of Runoff Mitigation Measures.

2022 Field Crops Weed Guide Available– *Mark VanGessel, Extension Weed Specialist*; mjv@udel.edu

The 2022 Mid-Atlantic Weed Management Guide is available online through Virginia Tech's Pest Management Guide – Field Crops. The digital version is free. The publication can be viewed online or a free pdf can be downloaded; hardcopies can also be order at their website. Either google VCE Publications 456-016, or follow this link www.pubs.ext.vt.edu/456/456-016/456-016.html. This is the same information that has been available through the PSU Extension Publications; however the PSU publication was not updated for 2022.

General

Chlorpyrifos Reminder – *David Owens, Extension Entomologist*, owensd@udel.edu

This is a reminder that chlorpyrifos is no longer permitted to be applied to crops with the exception of bark sprays to non 2022 fruit bearing trees.

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

Looking for a few resources for weed identification? Here are a few that I recommend:

Winter Annual Weeds; photoset developed by Barb Scott of the most winter weeds in Delaware https://www.udel.edu/content/dam/udelImages/canr/pdfs/extension/weed-science/winter-weeds-2019.pdf

Videos on identifying and managing some of the common weeds for burndown:

jagged chickweed:
https://youtu.be/TfHuN6wqf1E

evening primrose:
https://youtu.be/lXMdIykeyzY

field pansy or Johnny jumpup:
https://youtu.be/FfI3LxkYR1M

henbit:
https://youtu.be/acdqlavHxJs

horseweed:
https://youtu.be/IyKo8wUK938

Weed Identification Websites:

These two are very good, lots of weeds in the database and they include a key to help narrow down the options of weed photos to look through:

Virginia Tech Weed Science:
https://weedid.cals.vt.edu

ID Weeds from University of Missouri:
http://weedid.missouri.edu/

Announcements

Berries and Brambles: Small Fruit Production Sessions

Attend in person at the New Castle, Kent or Sussex County Extension Office OR join by Zoom.

Session One: Introduction to Small Fruit Production
Thursday, April 7, 2022 6:00-8:00 p.m.

Which berry crops might be a good option for your farm? Learn about the soil and site requirements for strawberry, blueberry and bramble production. The timing of planting, maintenance activities and harvest will help you understand how berries would fit with your current cropping system. We will also discuss marketing options, establishment costs and how berries might fit with your farm business.
Speakers: Dr. Gordon Johnson, Dr. Emmalea Ernest, and Nate Bruce

Session Two: Small Fruit Establishment
Thursday, May 5, 2022 6:00-8:00 p.m.

Get started successfully with strawberries, blueberries or brambles. Learn what you need to know about soil preparation, variety selection, irrigation systems, planting dates and trellising options.
Speakers: Dr. Gordon Johnson, Dr. Emmalea Ernest, and James Adkins

There is no registration fee but pre-registration is required.

Register online or contact Karen Adams (302-856-7303 or adams@udel.edu)

Combating Slugs as Pests of Soybeans and Corn

April 6, 2022 11:00 a.m.–12:30 p.m.
Online

Slugs pose a significant pest problem for growers of seedling grain crops—particularly corn and soybeans—in the Mid-Atlantic region.

The presence and activity of slugs are associated with practices that promote soil health: namely, no-till or conservation tillage and cover crops. Periods of cool, wet weather can lead to an otherwise healthy stand being severely impacted or lost.

This presentation will explore the biology of the two most common slug species and how we're working to control them. We will discuss pesticides and their shortcomings for slug management, cultural control tactics, and new research currently underway.

Speakers:
Dr. David Owens, Agricultural Entomology Extension Specialist, University of Delaware

Dr. Sally Taylor, Associate Professor and Field Crops Entomology Extension Specialist, Virginia Tech

Register at cornell.zoom.us/webinar/register/WN_6EqCIR_YQW2b5PyUM0Cexw.

The webinar will be recorded for anyone unable to attend the live session.

Webinar Series: Exploring the Elements and Interconnectedness of Our DE/MD Peninsula Food System

Mondays, stating April 11 12:00-1:00 pm EST
Online

Speakers from across a variety of food related sectors will offer presentations designed to increase knowledge about the make-up and workings of our DE/MD regional food system.

The health, heritage, economy, and culture of communities across the DE/MD region are all directly related to the production, distribution, preparation, and access to safe and healthy food. What are the connections that make up the regional "food system"? What are the links between how food is produced, processed, distributed, and sold across the region? How does our food system actually work?

Please CLICK HERE to Register

April 11
Healthy Food System = Healthy People, Communities and Economies – The Complex Nature of Our Delaware/Maryland Food System
Rita Landgraf, Professor, Director of Partnership for Healthy Communities, University of Delaware Department of Behavioral Health and Nutrition

April 18
An Overview of Our Delaware/Maryland Food System from an Agriculture Perspective
Nikko Brady, Deputy Principal Assistant Director Delaware Department of Agriculture and Cassie Shirk, Director of Legislation & Government, Maryland Department of Agriculture

April 25
Understanding Fruit and Vegetable Production in Within our DE/MD Food System
Gordon Johnson, Assistant Professor and Extension Specialist, Fruits and Vegetables, University of Delaware, Department of Plant and Soil Sciences

May 2
What's in Your Basket - Chicken or Eggs? Exploring Poultry and Egg Production Within our DE/MD Food System
Georgie Cartanza, Extension Agent – Poultry, University of Delaware Cooperative Extension

May 16
Knowing the Consumer in our Region and Increasing Food Accessibility
Gina Crist, Community Health Specialist, University of Delaware Cooperative Extension and Instructor, University of Delaware Department of Behavioral Health and Nutrition and Erin Norris, Planner (Natural Hazards) at Delaware Emergency Management Agency and Karen Shore, Founder and Principal of Upstream Strategies

May 23
Exploring Seafood and Aquaculture Production Within our DE/MD Food System
Chris Petrone, Extension Director, Marine Education, University of Delaware Sea Grant and Dennis McIntosh, Professor and Extension Specialist – Aquaculture, Delaware State University, Department of Agriculture and Natural Resources and Ed Hale, Assistant Professor and Marine Advisory Service Specialist, University of Delaware School of Marine Science and Policy

June 6
How Agricultural Production and Consumer Markets are Intertwined
Nate Bruce, Farm Business Management Agent, University of Delaware Cooperative Extension and Laurie Wolinski, Extension Agent - Agribusiness Risk Management, University of Delaware Cooperative Extension

June 13
Will Climate Change Impact our Regional Food System?
Jenn Volk, Associate Director of Cooperative Extension & Extension Specialist - Environmental Quality, University of Delaware Cooperative Extension and Emmalea Ernest, Scientist - Vegetables & Fruits, University of Delaware Cooperative Extension

TBD
Grazing, Food Production, and the Environment
Susan Garey, Kent County Extension Director & Extension Agent Animal Science and State 4-H Animal Science Program Coordinator, University of Delaware Cooperative Extension

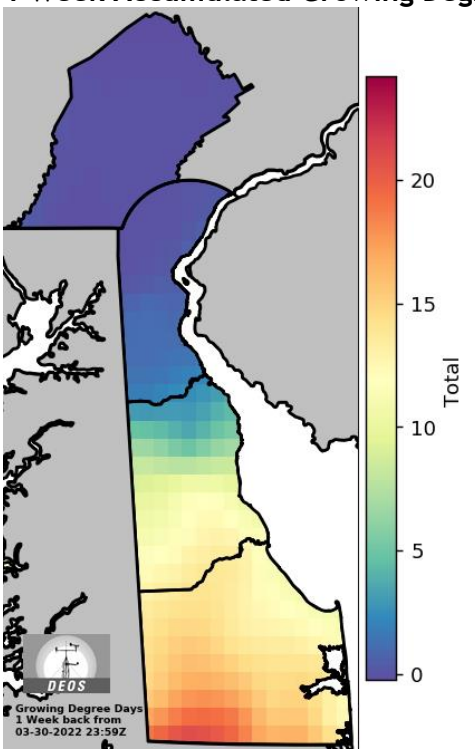
Updated Vegetable Recommendations Books Available

The 2022/2023 Commercial Vegetable Production Recommendations are available online.

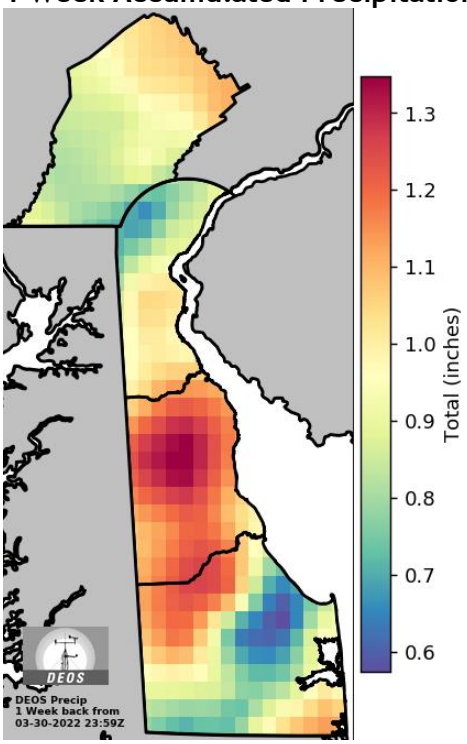
Printed copies of the books are available at all three of the county Extension offices courtesy of the Fruit & Vegetable Growers Association of Delaware. Books may be purchased for $20 for FVGAD members and $25 for non-members.

Weather Summary

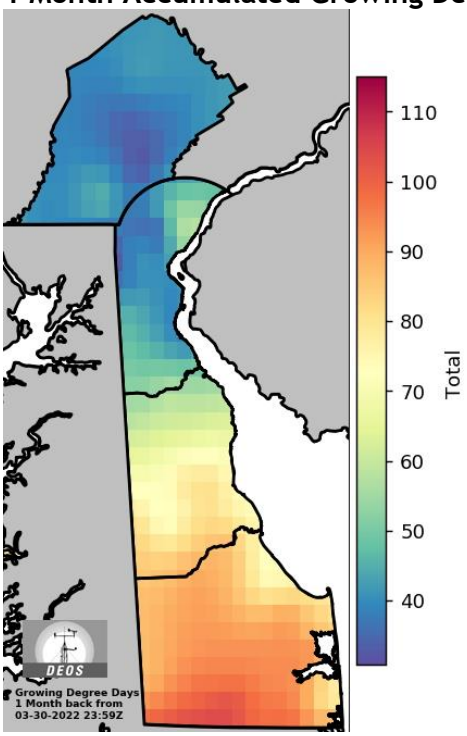
1 Week Accumulated Growing Degree Days



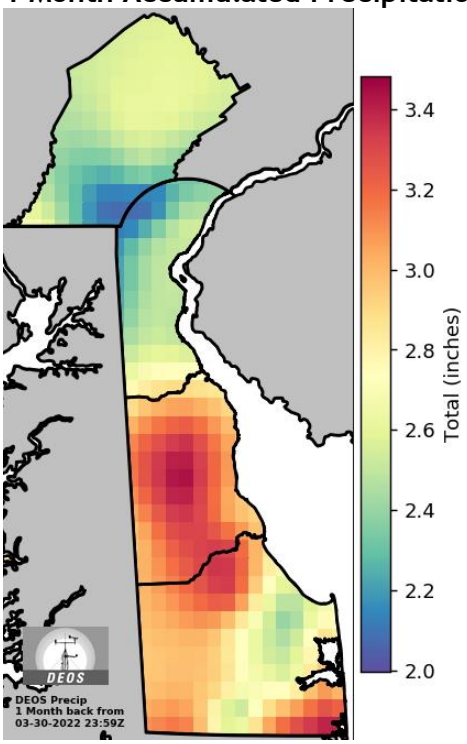
1 Week Accumulated Precipitation



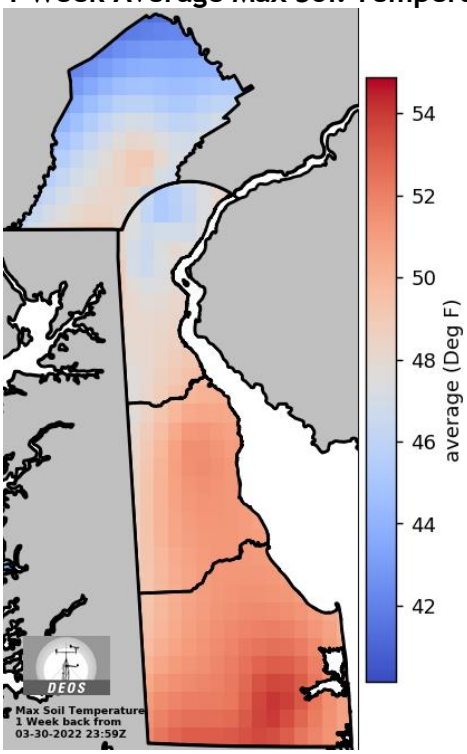
1 Month Accumulated Growing Degree Days



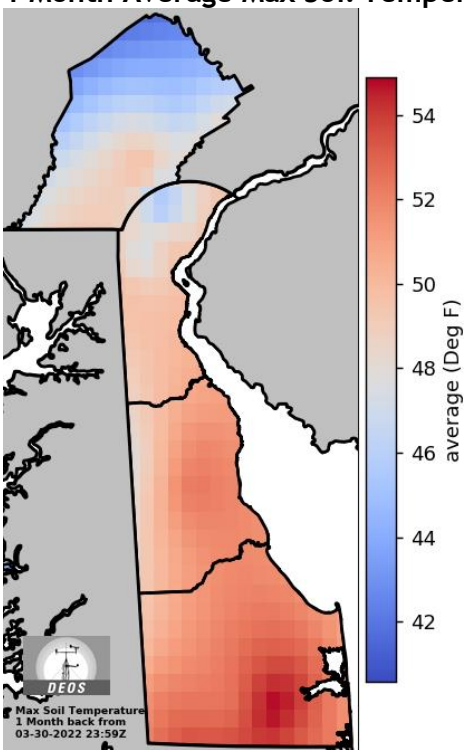
1 Month Accumulated Precipitation



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.