

WEEKLY CROP UPDATE



UNIVERSITY OF DELAWARE
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Notes

IPM Updates for Vegetables, Fruit and Agronomic Crops - David Owens, Extension Entomologist, owensd@udel.edu

Seedcorn Maggot Active

We are approaching degree day targets for Seedcorn Maggot in Georgetown. Adult flies were observed Wednesday in Lewes. According to the forecast period, we are heading into a cooling trend, I do not know what that will mean for early flight pressure on peas but suspect it will not be as intense as previous years. That said, still make sure you have an insecticide seed treatment on peas!

Allium Leafminer

Allium leafminer is a pest of onion, green onions, shallots, leeks, and garlic and was spotted throughout the state last year causing damage to alliums. Penn State has a good fact sheet on it here: <https://extension.psu.edu/time-to-prepare-for-protecting-allium-crops-from-allium-leafminer>. In Georgetown we will be at or very close to the target degree day threshold of 350 Celsius degree days (base temp 1 C) at some point during the first week of March. You can use the NEWA weather tool to calculate degree days from the closest weather station to you: <https://newa.cornell.edu/degree-day-calculator>. Good control options include row covers for March and April and systemic insecticides used with a spreader type adjuvant. Scorpion, Exirel, Radiant, and Entrust (OMRI) are the most effective materials, are translaminar or systemic, and will have the longest residual

activity. Repeat applications a couple of times during the adult flight period which typically lasts 5-6 weeks. Pyrethroids should be applied more frequently.

Tree Fruit

The window for controlling peach leaf curl diseases is closing. This disease can be easily treated with a fungicide application before buds begin to swell. Check out this UC fact sheet: <https://ipm.ucanr.edu/PMG/PESTNOTES/pn7426.html>.

Small Grains

Greenbug, while generally uncommon, may be overwintering in our area this year due to the mild winter. It is light green, has short, green cornicles or 'tail pipes' and often has a bluish streak down the back. It looks pretty similar to English grain aphids except EGA has longer, black tailpipes. Earlier this month we scouted 6 malting barley fields, average aphid counts ranged from 3 to 40 per square foot. Typical small grain thresholds are around 100 per ROW Foot. We are starting to see some parasitic wasp and syrphid fly adult activity in fields. Treatments for aphids are usually the most cost effective when applied in the fall and in fields with a history of barley yellow dwarf virus.

Slug Factsheet

A new fact sheet on slugs is available from University of Maryland: <https://extension.umd.edu/resource/managing-slugs-field-crops-using-ipm-principles-fs-2022-0629>.

New Research on Endophytes in Plants -
Gordon Johnson, *Extension Vegetable & Fruit Specialist*; gcjohn@udel.edu

I recently participated in a workshop on soil health at the New Jersey Vegetable Growers Conference. Dr. James White of Rutgers University gave a fascinating talk on the importance of endophytes in plants.

I spent several years working on endophytes in corn and other crops with a small startup company in the 1980's and was interested to see how the science had evolved.

Endophytes are microorganisms that live inside of plants but do not cause disease and often provide substantial benefits to the plant. There are both fungal and bacterial endophytes. Some familiar systems are the fungal endophytes of fescue that allow for better stress tolerance in turfgrass, mycorrhizal fungi that help extract nutrients such as phosphorus from soils, and the symbiotic Rhizobium bacterial associations that fix atmospheric nitrogen that plants then can use.

Dr. White and his students have investigated the process of rhizophagy. In this process endophytic microbes that live within the plant supply nutrients and elicit root responses. Studies have shown that as much as 70% of the nitrogen in plants might be acquired from bacterial endophytes in natural systems.

Dr. White noted that “many bacteria and fungi cycle between a free-living phase in the soil and a plant-dependent phase within cells of plant roots. Microbes obtain nutrients (nitrogen and other minerals) in soil, and then nutrients are extracted from microbes in the cells of plant roots”.

In the rhizophagy process, bacteria are absorbed by roots and live between plant cells and within plant cells. The plants then break down the bacteria and then use them as nutrient sources. There are many bacterial that live in the soil that can fix nitrogen freely. When these are then internalized and consumed by plant, this nitrogen is supplied to the plant.

This is a separate process from the symbiosis seen in legumes with Rhizobium bacterial and one that non-legumes can benefit from. The recently commercialized Envita™ inoculant uses *Gluconacetobacter* bacteria to provide nitrogen to non-legumes. Again this is interesting as I had been doing research on this bacteria over 20 years ago. It was commonly found in sugar cane fields that required little nitrogen fertilizer.

The rhizophagy process occurs initially in plant roots. Bacteria are common around root tips where new root cells are formed and feed on the exudates from plants. The plant then signals certain bacteria to enter the newly formed cells close to the root cap. Once inside the root, these bacteria lose their cell wall but they are still alive. The plant uses these stripped bacterial cell walls as food. Some of the bacteria stay between cell walls, others enter the plant cells themselves, or make their way up the plant to other growing parts. These endophytes can even enter fruits and seeds. The internalized bacteria can then be “eaten” as necessary by the plant to provide more nutrients.

Some of the internalized bacteria survive and move to newly forming root hairs where they release plant hormones that cause root hairs to grow. The bacteria then multiply and eventually are released by the root hairs back into the soil, forming clusters around the root, extracting nutrients from the soil, and repeating the process. Not only is nitrogen supplied to plants in this way but other nutrients such as phosphorus and the trace metals (iron, manganese, zinc) are also made more available.

There is no difference between plant mineral nutrients derived from rhizophagy and those derived directly from the soil water. However, this root association with bacteria has other benefits to the plant. Hormones released by the bacteria are growth promoting in the roots and other plant parts. Also, the endophytic bacteria produce nitric oxide to protect themselves inside the plant and this becomes a nitrogen source to the plant.

These root-associated endophytic bacteria also are protective against plant diseases by competition or by altering the microbial composition in the root environment.

According to Dr. White “people have speculated that plants can get nutrients from microbes, but mechanisms for transfer of nutrients from microbes to plants have been elusive - until now”. “Understanding how this process works may allow us to grow plants with reduced fertilizers”.

Some of these bacteria also will limit the growth of certain plants. Again from Dr. White: “we can manipulate the system to increase the growth of desirable plants and decrease the growth of undesirable plants (weeds), potentially using the same microbes.”

As we further understand endophytes there is potential for expanded use in crop production systems.

Growing Garlic from a Late Winter Planting

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

Our recommendations for commercial garlic production most commonly are to plant in the fall, overwinter, and then harvest in the late spring or early summer. Experience has shown that spring planted garlic is often lower yielding and may not divide into cloves but produce only solid bulbs. However, there are growers that in our region that have had success with late winter planted garlic that produced good yields. The following are some recommendations for late winter planted garlic.

Garlic needs a cold period of 3-6 weeks below 40°F to produce normal bulbs. The longer the cold period the better. Hardneck types such as the popular Porcelain variety ‘Music’ need more cold than the softneck types such as ‘Polish White’. Obtain cold treated garlic bulbs or treat bulbs by placing in a cold box at those temperatures for a minimum of 2 weeks. When you get your bulbs separate into cloves and only plant the largest, rounded (or plump) ones.



Only the largest cloves should be planted.

Prepare your soil as early as it can be tilled, add necessary lime, phosphorus, and potassium (150 lbs./a of each) and 125 lbs./a of N as Ammonium Sulfate. Sites that warm up quickly or sites with every row rye windbreaks that will protect against wind (once elongated) are best. Warm soils will promote early growth.

Lay black plastic mulch on raised beds with 2 drip lines. Plant cloves pointed side up, through the mulch at regular garlic spacing (3-4 rows per bed, 6-8 inches between cloves) no deeper than 2 inches. Plant in late February or early March using the largest cold treated cloves. Add an additional 25 lbs./a N once garlic is 6 inches tall through the drip system and irrigate regularly. The goal is to get as much top growth as possible before bulbing is initiated in April.

Following these guidelines, a spring crop of garlic can be successful.



Cornell Cooperative Extension

Late winter planted garlic is best planted on raised beds with black plastic mulch.

Green Garlic

Another option is to not grow garlic for bulbs but to grow garlic to harvest in the green stage. Green garlic is harvested and sold like green onions. You can plant smaller cloves, cloves that have not been cold treated, or bulbils (the mini onion bulbs collected from scapes). Close spacings are used and plastic mulch is not necessary.



University of California

Green garlic is harvested like green onions and can be produced from smaller cloves, cloves that have not been cold treated or bulbils.

Hot Water Treatment of Seeds to Manage Certain Diseases in Vegetables - Emmalea Ernest, Scientist - Vegetable Crops; emmalea@udel.edu

Hot water treatment of seeds is a method to manage certain seed borne diseases of vegetable crops. This treatment has the benefit of killing pathogens on both the outside and the inside of the seed coat.

Some common examples of diseases managed this way include:

Cole Crops - black rot

Tomatoes - bacterial canker, bacterial speck, bacterial spot

Peppers - bacterial leaf spot

A more complete list of seeds that can be treated, treatment times and temperatures, and diseases controlled can be found at <https://ag.umass.edu/vegetable/news/hot-water-treatment-of-seeds>

The **2022/2023 Mid Atlantic Commercial Vegetable Production Recommendations** include instructions for hot water seed treatment on page 129.

“Seed heat-treatment follows a strict time and temperature protocol, and is best done with thermostatically controlled water baths. Two baths are required: one for pre-heating and a second for the effective pathogen killing temperature. The initial pre-heat treatment is 10 minutes at 100°F (38°C). The effective temperature treatment and time in the second bath differ between crops; protocols for several important crops are listed in Table E-9.

Immediately after removal from the second bath, seeds should be rinsed with cool water to stop the heating process and dried on screen or paper. Seeds may be re-dusted with fungicide if desired. Pelleted seed is not recommended for heat treatment. Heat treat only seed that will be used during the current season. See crop sections for specific seed treatment recommendations.”

Hot Water Treatment Equipment Available for Use

The University of Delaware Extension Vegetable

program has the equipment to hot water treat seeds. Please contact Emmalea Ernest emmalea@udel.edu to arrange to use the equipment.

Red Legged Winter Mites Causing Damage to Leafy Greens in High Tunnels - Jerry Brust, IPM Vegetable Specialist, University of Maryland; jbrust@umd.edu

The red legged winter mite, *Penthaleus dorsalis* has been found causing damage in high tunnels (HTs) growing leafy greens. These reports have been from Maryland, New Jersey, Pennsylvania, Delaware, New York, Connecticut and, for the first-time, from the Midwest (Missouri).

Red legged winter mites are very small with dark purple/black bodies and bright red legs (Fig. 1). They thrive in what we would normally consider conditions too cold for an arthropod to cause problems. This mite is cold adjusted and cannot stand hot dry soil conditions and will die as summer heat approaches. Eggs are laid in late spring and over-summer in the soil. These are stress resistant eggs (i.e., they withstand drying and heat as well as synthetic chemical applications, but not steam applications). In the fall they will begin to hatch and mites will be active throughout the fall and winter inside a high tunnel with crops. Damage appears as 'silvering' or 'whitening' of the fed upon foliage (Fig. 2). Mites are most damaging to newly emerging crops, greatly reducing seedling survival and development, but they also can make larger plants unmarketable.

I think the red legged winter mite is more of a problem now because we have many more high tunnels that are producing winter vegetables and because our winters are not as cold as they once were. In addition, growers have a problem detecting the little pests until it is too late and the reasons for this are several. First the mites are very small and it takes many mites to damage a crop, so their numbers can slowly build over time. The mites also are most active in the evening and overnight, come morning and the high tunnel begins to heat up the mites tend to stay under the foliage of plants in contact

with the cool moist soil and can go unnoticed. Another problem is the damage that mites do on plants early-on looks very much like cold damage. Figure 3 shows cold damage to plants that looks similar to mite feeding damage (Fig. 4). So, growers think the whitening damage they are seeing on their plants is from cold exposure and not mite feeding. Growers also could think the whitening damage is due to salt accumulation in their leafy crop.

Red legged winter mites are difficult to control even when using synthetic chemicals. Foliar sprays of Pyrethroids (check label for the particular crops that are labeled as this will vary greatly) or Entrust (Spinosad) combined with neem or some other hort oil will reduce feeding, but if mite populations are high it will be difficult to eliminate the damage. This is usually the case when growers contact me, their mite populations are very high and little can be done at the time for control. Applications should start as soon as damage is noticed before mites have a chance to build their population. Foliage should be thoroughly covered with spray material as should soil around the base of plants.

Cultural controls involve using high levels of heat such as clear plastic mulch that is used to heat the soil and kill mites and if used in the summer even their eggs. Steam heat used to control nematodes, soil pathogens and weed seeds can be used to greatly reduce mite numbers before the next planting. Many cultivations during the summer can significantly decrease the number of over-summering eggs that survive. During the winter growing season once a crop is done it may be possible to take out all the green material in a high tunnel wet the ground and place leaves of mustard greens on the soil as a way to bring the mites to the surface to feed, then use a propane torch to burn the leaves and the mites at the same time- this method is being trialed now to see if it helps. The growers at ECOCity Farms have reported that the red legged winter mite's most preferred crops are purple mustards, mustard greens, Pac Choi and salanova with spinach, red Russian kale, collard greens, arugula and cilantro being moderately preferred.



S Miller, ECOCity Farms

Figure 1. Many tiny red legged winter mites on a leaf



G Brust, University of Maryland

Figure 2. Red legged winter mite damage to spinach



G Brust, University of Maryland

Figure 3. Cold damage to crop



G Brust, University of Maryland

Figure 4. Red legged winter mite damage to crop

2022 Soybean Planting Population Research - Jarrod O. Miller, Extension Agronomist, jarrod@udel.edu

Our updated research on soybean planting population, row spacing, and irrigation can be found on the Delaware Agronomy Blog: <https://sites.udel.edu/agronomy/2023/01/27/2022-soybean-yield-response-to-planting-populations-row-spacing-and-irrigation-in-delaware/>

Registration is Open for Virtual Mid-Atlantic Crop Management School

We are excited to announce that registration for the Virtual Mid-Atlantic Crop Management School is now open. This virtual crop school offers 18 distinct, professionally produced video modules of selected talks from our in-person 2022 Crop School that was held in Ocean City in November 2022. This event is held in addition to the traditional in-person crop school and will not replace the 2023 in-person Mid-Atlantic Crop Management School. Modules will be available until 5:00 p.m. on Monday, March 13. To ensure that attendees have adequate time to view modules and receive credits, registration will close at 5:00 p.m. Thursday, March 9.

Who Should Attend? Modules are suitable for anyone interested in crop management topics. This includes:

- agronomists
- crop consultants
- extension educators
- farmers and farm managers
- pesticide dealers, distributors, and applicators
- seed and agrochemical company representatives
- soil conservationists
- state department of agriculture personnel

Registration Website:

<https://www.pcsreg.com/mid-atlantic-crop-management-school>

Program with Abstracts and Credits

Two [registration](#) options are available:

1. Individual module access (\$15 each) allows you to view and receive credits for only the module(s) you select. There is one Soil and Water module that is offered free of charge.
2. Full access (\$200) allows you to view and receive credits for all available modules.

Note: Full access is recommended for individuals who did not attend in-person Crop School in Nov 2022 and are seeking CCA or DE/MD Nutrient

Management and pesticide credits. The full access price represents a \$45 savings over a-la-carte purchase.

IMPORTANT! 2022 Mid-Atlantic Crop

Management School Attendees: You are eligible to receive CEUs for modules only if you **DID NOT** attend that session at the in-person school. Please check your records **BEFORE** you register as **refunds and credits will not be issued to individuals who are not eligible to earn CEUs.**

IMPORTANT! Please verify that the module offers the credits you need prior to registering. [Credits at a Glance](#)

Registrations must be processed manually to allow access to content. As such, access to content for registered users may be delayed for up to 24 hours (longer on weekends) from the time you register. You will receive two confirmation emails. The first email is proof of registration/payment. The second email will confirm that your registration was completed and will include the website link to access content.

Obtaining CEUs

- Certified Crop Advisor - Participants seeking CCA credits only will need to confirm that they viewed the material to receive credit.
- State Nutrient Management and Pesticide Programs - **Registered participants will receive CEUs for each session upon successful completion of the module specific evaluation/quiz.** State level programs require participants to correctly answer 4 of 5 webinar specific content questions to receive credits.
- Virginia Pesticide - **Virginia Commercial Pesticide Credits are pending approval.** Registrants seeking Virginia Private Pesticide CEUs will be required to watch a legislative update and two safety videos. Links will be provided in the module.

Records of successfully completed CEU modules will be submitted to participating State

programs and CCA after the programs close on March 13, 2023.

Please contact nutrient-management@udel.edu with any questions about the virtual school.

NRCS Announces Additional Conservation Funding Opportunities for Delaware Farmers and Landowners

The USDA Natural Resources Conservation Service (NRCS) is encouraging all Delaware agricultural producers to apply today for assistance to improve the health and productivity of their agricultural land through climate-smart conservation practices.

The Inflation Reduction Act (IRA) provides additional assistance through the Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP) for practices and activities that directly reduce greenhouse gas emissions or increase carbon sequestration.

“Through the Inflation Reduction Act, NRCS is expanding access to financial and technical assistance for producers to advance conservation on their farms,” NRCS State Conservationist Kasey Taylor said. “The practices and activities we are offering not only work to mitigate the effects of climate change, but create value and economic opportunities for Delaware’s producers.”

Climate Smart Agriculture and Forestry (CSAF) conservation practices and activities include cover cropping, conservation tillage, wetland restoration, prescribed grazing, nutrient management, tree planting and more. These practices and activities directly improve soil carbon, reduce nitrogen losses, or reduce, capture, avoid, or sequester carbon dioxide, methane, or nitrous oxide emissions associated with agricultural production.

While NRCS accepts applications for financial assistance programs year-round, interested applicants in Delaware should apply no later than March 17, 2023 for EQIP and March 24, 2023 for CSP to ensure consideration for fiscal year

2023 funding. Funding is provided through a competitive process.

To apply for financial assistance, contact your local USDA Service Center. In Sussex County, call 302-856-3990, ext. 3; in Kent County, call 302-741-2600, ext. 3; and in New Castle County, call 302-832-3100, ext. 3. Additional information on NRCS programs and services is available on the Delaware NRCS website at www.de.nrcs.usda.gov.

“Mending Our Fences” Podcast Released to Address Farmer Stress

We all feel stressors and we all manage in different ways. We know farmers are resilient, but we can learn from each other about mending what ails us. The University of Delaware Cooperative Extension and the Extension Cohort for Cultivemos are pleased to announce that **Mending Our Fences**, a new podcast series has been released. It was sponsored by the Cultivemos/North East Farm and Ranch Stress Assistance Network, and has been posted on **Google**, **Spotify** and **Apple**. During the episodes you’ll listen to folks from the realms of agriculture and mental health come together to look at some of the every-day hard things that come with life in agriculture, take them apart to learn more about what makes them hard and put them back together in sometimes surprising ways that promote hope, possibility and resilience.

The podcast is hosted by Lisa O'Hara from Bodhi Counseling in Maryland who talks with three Extension educators including Josh Taylor with University of Vermont; Ginger Fenton with Penn State University Cooperative Extension; and Maria Pippidis, Extension Educator University of Delaware Cooperative Extension. These Extension guests share stories they have experienced as they’ve worked with farm audiences; names are changed to protect clientele. Though the stories may feel familiar, each episode sheds light on sticky farming issues, and as a group they explore what makes it hard to talk about that topic and identify some solutions.

“We wanted to create the opportunity to make it easier for you to come together to support each other because we all deal with hard things,” says O'Hara. “Our hope is to normalize a lot of the impact of the stressors by taking an individual topic apart, add some clarity and offer best practice in managing those stressors.” Together we can work to Mend Our Fences.

Each episode focuses on a different topic. Each episode builds on the previous with strategies to manage the stressors and finishes up with some strategies to be more resilient.

- Podcast 1: Money and Financial Security
- Podcast 2: Farm and Family Dynamics
- Podcast 3: Connection to the Land
- Podcast 4: Succession Planning and Farm Legacy
- Podcast 5: Managing Change/Uncertainty
- Podcast 6: Grief and Loss
- Podcast 7: Building Resilience, Creativity and Innovation

Announcements

Risk & Opportunity Management Conference

Monday, March 6, 2023 8:30 a.m. - 3:00 p.m.
University of Delaware Paradee Center
69 Transportation Circle Dover, DE 19901

Delaware Farm Bureau and Delaware Cooperative Extension have come together to host an Agricultural Risk and Opportunity Management Conference.

Topics that will be discussed include, input cost management, grain marketing, crop insurance, and much more. The program is zero cost for participants and lunch will be provided. Please RSVP using the link below:

<https://form.jotform.com/230395309013146>

Profiting from a Few Acres Conference

Thursday, March 9, 2023 8:30 a.m. – 4:00 p.m.
Modern Maturity Center
1121 Forrest Avenue Dover, DE 19904

The Delaware State University Cooperative Extension Small Farms Program is offering the Annual Profiting from a Few Acres Conference this year in person at the Modern Maturity Center in Dover Delaware on March 9th and will cover a variety of trending agriculture topics to help increase profit on your small farm. Some of the topics include:

- Agrivoltaic productions systems
- Expanding access to healthy food with SNAP
- Transitioning dairy to dairy beef
- Pawpaw productions
- Agrotourism
- Integrated pest management
- DSU & USDA Program Updates
- and more

There will also be a variety of vendors available to visit on site.

Participants can also apply to be an EBT approved establishment on site the day of the conference.

To register for this event, please click this link:

<https://www.eventbrite.com/e/profitting-from-a-few-acres-conference-tickets-453039582587>

Early Season Pest ID

Tuesday April 11, 2023 5:00 – 7:00 p.m.
Kent County Cooperative Extension Office
69 Transportation Circle, Dover DE 19901

University of Delaware Extension Specialists will cover the following topics:

- Early season weed pressure in corn and soybeans
- Insect pests in planting and early season corn and soybeans
- The importance of correct and accurate pest identification
- Proper identification techniques of insect pest and weeds
- How utilize integrated pest management when facing early season pest pressure

An evening session for new and experienced field scouts or anyone interested in properly identifying pests that may affect crops in and around planting season.

Registration information will be available soon.

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

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