Vegetable Crops

**Vegetable Crop Insects** - Joanne Whalen, Extension IPM Specialist; jwhalen@udel.edu

**Leafminers in Vegetable Crops**
Each spring, we receive reports of leaf miners attacking spring planted vegetable crops. There are a number of potential species that attack vegetables including the vegetable leafminer, serpentine leaf miner, spinach leafminer and beet leafminer. Leaf miners can be difficult to control and we have limited experience with control strategies in our area. The following links provide information on some of the potentially important species:

- [http://entnemdept.ufl.edu/creatures/veg/leaf/vegetable_leafminer.htm](http://entnemdept.ufl.edu/creatures/veg/leaf/vegetable_leafminer.htm)
- [http://entnemdept.ufl.edu/creatures/veg/leaf/a_serpentine_leafminer.htm](http://entnemdept.ufl.edu/creatures/veg/leaf/a_serpentine_leafminer.htm)

**Cabbage**
Continue to scout for diamondback and imported cabbageworm larvae. A treatment should be applied when 5% of the plants are infested and before larvae move to the hearts of the plants.

**Melons**
Continue to scout all melons for aphids and cucumber beetles. Aphids can be found in some of the earliest transplanted fields. As a general guideline, a treatment should be applied for aphids when 20 percent of the plants are infested with 5 aphids per leaf and before significant leaf curling occurs.

**Potatoes**
Continue to sample for Colorado potato beetle adults and egg laying. A treatment should be considered for adults when you find 25 beetles per 50 plants and defoliation has reached the 10% level. Once larvae are detected, the threshold is 4 small larvae per plant or 1.5 large larvae per plant.

**Snap Beans**
All seedling stage fields should be scouted for thrips activity. The thrips threshold is 5-6 per leaflet. Be sure to also watch for bean leaf beetle feeding. Damage appears as circular holes in leaves and we have seen significant damage in recent years on the earliest planted fields. As a general guideline, a treatment should be considered if you defoliation exceeds 20% prebloom.

**Sweet Corn**
Continue to sample for cutworms and flea beetles. As a general guideline, treatments should be applied if you find 3% cut plants or 10% leaf feeding. In order to get an accurate estimate of flea beetle populations, fields should be scouted mid-day when beetles are active. A treatment will be needed if 5% of the plants are infested with beetles.
Summer Soil Improving Crops for Vegetable Rotations - Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu

Where possible, vegetable growers should consider the use of summer soil building crops. This can be between spring and fall crops, prior to mid-season plantings or anytime there is about 6-8 weeks of fallow time. Use of these summer soil improving crops can help maintain or increase organic matter levels, address certain soil disease issues (fungal pathogens, nematodes), add nitrogen to the soil in the case of legumes, reduce weed pressure, and improve soil physical characteristics.

Summer Soil Building Crop Options for Delmarva
The following are some soil building crops for summer use that I recommend.

Legumes
Cowpea (Vigna unguiculata)
Also known as blackeye or southern pea, this crop is underutilized in our area. It is fast growing with peak biomass often in 60 days. Cowpeas can fix up to 100 lbs of N per acre with biomass of 3000-4000 lbs/a. Cowpeas grow well in poor soils and can handle droughty conditions. Drill at 40-50 lbs per acre. Certain varieties such as California Blackeye #5 and Mississippi Silver are poor nematode hosts and will be beneficial in systems where root knot nematode is a problem. See this site for nematode ratings of different cowpea varieties http://edis.ifas.ufl.edu/in516#TABLE_1.
Cowpeas also can be harvested in the immature pod stage as a fresh legume so can serve dual purpose in small farms.

Soybean
Soybean can also be a good cover crop drilled at 60 lbs per acre. Forage-type soybeans produce considerable biomass and make excellent cover crops. For nematode suppression, use of root knot nematode resistant varieties may be beneficial. Edamame types can be harvested and sold in green pod stage and the residue returned to the soil for soil building, again serving a dual purpose on small farms.

Sunnhemp (Crotalaria juncea)
I am very interested in having more growers consider planting sunnhemp as a summer soil-bulider. This is a tropical legume that is used extensively for soil building in countries such as Brazil and India. Drill 20-30 lbs of seed per acre. Sunnhemp can produce very high amounts of biomass (10 ton biomass is not unheard of in Florida - amounts will be lower here on Delmarva, expect 3-4 tons). It is a high nitrogen fixing legume and can contribute over 100 lbs of N to a following crop. Sunnhemp grows very fast in the summer, reaching 6 feet or taller in 8 weeks. However, a better way to manage sunnhemp is to let it grow to about 1-3 feet tall, then mow it and let it regrow again. If allowed to get too tall and old the stems will become tough and fibrous and will not decompose rapidly. Sunnhemp is a day length sensitive crop. It will grow any time during the summer, however it will not flower and go to seed until the days start getting shorter in very late summer.

Non Legumes
Sorghum-Sudangrass (Sorghum bicolor x S. sudanense)
Sorghum-sudangrass is a cross between forage or grain sorghum and sudangrass. It is a warm-season annual grass that grows well in hot conditions and produces a large amount of biomass. Plant at 20-40 lbs per acre drilled. Of all the non-legumes, it is the most useful for soil building. Sorghum sudangrass will often reach 6 ft in height. Like sunnhemp, it can be mowed and allowed to regrow to enhance biomass production and have younger material that decomposes more quickly. Expect 3-4 tons of biomass addition per acre. As a grass, to get the most growth you will need to add nitrogen fertilizer (40-80 lbs/a). If incorporated at a young stage, the nitrogen will be re-released for the following crop. Sorghum-sudangrass is very effective at suppressing weeds and has been shown to have allelopathic and biofumigant properties. Research on nematode suppression by sorghum-sudangrass is mixed with some studies showing that sorgum-sudangrass suppresses nematode levels. Choose finer stemmed, leafy varieties when available. Brown midrib types will decompose more quickly because they have less lignin.

Forage-type Pearl Millet (Pennisetum glaucum)
Pearl millet is a tall summer annual grass that...
grows 4 to 8 ft. tall. It is well adapted to sandy and/or infertile soils and does well in the summer heat. Forage types are better adapted for soil improvement than the grain types. Seed at 20-30 lbs/a drilled. Expect 3-4 tons of biomass addition per acre. Again, as a grass, to get the most growth you will need to add nitrogen fertilizer (40-80 lbs/a). Pearl millet has been shown to suppress some nematodes. Forage pearl millet can make a good mulch for late-summer planted crops no-till or strip till.

All of the crops above can be planted from late May through late July for soil improvement use.

There are many other possibilities for summer soil improving, however the ones listed above are my recommendations for growers on Delmarva to try.

Reduction Pre-Harvest Interval for Sandea on Pickling Cucumbers - Mark VanGessel, Extension Weed Specialist; mjv@udel.edu

Delaware has received a 24c label for lowering the pre-harvest interval for Sandea used in pickling cucumbers to 21 days. This is a very narrow window of application since postemergence applications must be delayed until the cucumbers have at least 3 true leaves but the 21 day interval needs to be observed.

New Supplemental Label for Presidio - Nathan Kleczewski, Extension Specialist - Plant Pathology; nklezew@.udel.edu

Presidio fungicide has a new supplemental label that was recently released. The rotational interval to corn has been reduced from 18 months to 30 days. The label can be accessed at the Field Crops Disease Management Blog: http://extension.udel.edu/fieldcropsdisease/2014/05/09/new-supplemental-label-for-presidio/.

Reminder About Potato Disease Advisory - Nathan Kleczewski, Extension Specialist - Plant Pathology; nklezew@udel.edu

We will be publishing the potato disease advisory in the subsequent WCU. If you would like to be added to the potato disease advisory early alert group, please contact me at nklezew@udel.edu or call at 302-300-6962.

Fruit Crops

Section 18 for Brown Marmorated Stink Bug (BMSB) Management on Stone and Pome Fruit Approved - Joanne Whalen, Extension IPM Specialist; jwhalen@udel.edu

Our Section 18 request for the use of 2 dinofeturan products (Trade Names: Venom from Valent U.S.A. Corporation; Scorpion from Gowan Company, LLC) to control BMSB on stone and pome fruits has been approved by EPA. This use expires on Oct 15, 2014. You must have a copy of the label in your possession before making an application. A copy of the Venom label is online: https://extension.udel.edu/weeklycropupdate/files/2014/05/Venom-Sec-18-label-pome-stone-fruit-DE-2014.pdf. We will post the Scorpion label as soon as it is available. Please contact either David Pyne at the Delaware Department of Agriculture (David.Pyne@state.de.us) or Joanne Whalen (jwhalen@udel.edu) for more information.

Agronomic Crops

Agronomic Crop Insects - Joanne Whalen, Extension IPM Specialist; jwhalen@udel.edu

Alfalfa

Be sure to check for alfalfa weevil adults and larvae within a week of cutting, especially if populations were above threshold before cutting. Feeding from both stages can hold back re-growth. After cutting, there needs to be enough “stubble” heat to control the weevils with a cutting. A stubble treatment will be needed if you find 2 or more weevils per stem and the population levels remain steady.
Field Corn
Be sure to watch for both cutworms and slugs feeding in newly emerged corn fields. As a general guideline, a treatment is recommended for cutworms if you find 10% leaf feeding or 3% cut plants. If cutworms are feeding below the soil surface, it will be important to treat as late in the day as possible, direct sprays to the base of the plants and use at least 30 gallons of water per acre. For cutworms, fields should be sampled through the 5-leaf stage for damage.

If slugs are damaging plants, you will be able to see “slime trails” on the leaves. In fields that are just emerging we may see more injury from slugs that have just started to hatch in the last week. Old existing stocks of Deadline M-Ps should be available for slug management this year in field corn. Additional products available for slug management in field corn include Sluggo (iron phosphate) and IronFist (sodium ferric FDTA).

Small Grains
Grass sawflies, true armyworms and cereal leaf beetles can be found in fields throughout the state. Population levels of all 3 insects remain variable so scouting fields will be the only way to determine if an economic level is present. Research from Virginia and North Carolina indicates that the greatest damage from cereal leaf beetle can occur between flowering and the soft dough stage. Although armyworm can attack both wheat and barley, they can quickly cause significant losses in barley. We are also seeing an increase in aphid numbers so you will also need to watch for aphids feeding in the heads of small grains. The treatment threshold is 20-25 aphids per head with low beneficial insect activity.

This past week we have seen an increase in the number of native brown stink bugs in barley and wheat. In years past, we have seen brown stink bugs in barley and wheat and so far we have not felt that we have seen any losses. In states to our south where stink bugs are more of a problem in wheat they indicate that it is not uncommon to find stink bugs in small grains after head emergence. However, it takes extremely high numbers to cause economic damage to heading wheat. Research from the early 80s showed that the milk stage of development is most susceptible to damage from stink bugs by reducing grain weight and germination. Once wheat reaches the hard dough stage the likelihood of damage from stink bug is diminished greatly.

Small Grains Disease Update - Nathan Kleczewski, Extension Specialist - Plant Pathology; nkleczew@udel.edu
We continue to see low levels of Stagonospora and Septoria as well as spot blotch in small grains. In most fields, these diseases still occur in the lower canopy. Powdery mildew is still present in some fields at low levels. I first detected a few sparse pustules on a susceptible wheat variety in a test plot on Tuesday. Variety trials in Middletown and Georgetown remain relatively free of disease. We have seen some abiotic flecking that may be related to the temperature drop we had several days ago. Wheat is between Feekes 6-8, with a few fields at Feekes 10. Barley has headed out in most areas. Continue to monitor the lower canopy as plants move past flag leaf, which will likely occur rapidly with increasing temperatures. The forecast is also calling for rain in the early part of next week.

Defining Resistance to Pathogens in Agronomic Crops - Nathan Kleczewski, Extension Specialist - Plant Pathology; nkleczew@udel.edu
Why does resistance to some pathogens not result in disease and for other pathogens disease still occurs? A complete discussion of the complex physiological, genetic, and phytochemical responses involved in resistance is not something that can be covered in the WCU. I will instead provide some very general information that may help clarify what you may see in field crops.

First, remember that we have two basic groups of pathogens -- some need a host to survive and reproduce (obligate pathogens) and some can continue to develop in the absence of a plant host (non-obligate). Examples of obligate pathogens in agronomic crops include rusts,
powdery mildew, downy mildew, viruses, and smuts. Examples of non-obligate pathogens include Fusarium diseases, Rhizoctonia, and leaf spots (Grey, Northern, Southern, Septoria, Stagonospora, Frogeye).

In many pathosystems involving the obligate pathogens, resistance is what we call vertical or race specific. This means that the host plant carries one or several resistance (R) genes that enable detection of the pathogen and defense against specific races (genetic groups) of a pathogen. Think of these R genes as triggers -- they are tripped and result in a rapid response by the plant that can quickly stop the pathogen before it can set up shop. Sometimes this interaction is observed as tiny flecks on foliage. Each fleck might be a spot where a spore from a rust or powdery mildew landed on the leaf and was corralled before it could establish a connection with the host. This rapid response is known as a hypersensitive reaction. If a pathogen race moves in and the host lacks an appropriate R gene, then disease will progress normally. Examples of such occurrences include powdery mildew in wheat and barley, stripe rust, and southern rust in corn.

In other pathosystems involving nonobligate pathogens plants depend on the action of many genes. The sum activity of these genes results in the overall resistance to a pathogen. This resistance is often called horizontal resistance. Horizontal resistance does not use R genes. Instead, the genes involved tend to produce defensive structures or chemicals. Because horizontal resistance does not involve a hypersensitive reaction, the response is slower. Consequently, disease can still develop, although it is often greatly reduced. Unlike vertical resistance, races don’t tend to overcome this type of resistance and the environment can influence the degree of defense.

Thus, not all resistance is created equal. This is why resistance to powdery mildew and rusts seems so absolute, but for leaf spots and head blight it is more variable. If you see some leaf spots on a variety that was rated as resistant, this does not indicate that the resistance is failing.

What Can You Expect with a Fungicide Application for Suppression of FHB? - Nathan Kleczewski, Extension Specialist - Plant Pathology; nkleczew@udel.edu

It is important that anyone who plans to use a recommended fungicide for scab suppression (Prosaro®, Caramba®, Proline®) understand that these fungicides will not result in control of scab similar to what you have seen for other pathogens such as rusts and powdery mildew. Due to variability with developmental stage of tillers and other factors, one can expect AT BEST around 42-45% reduction in DON. Use of these fungicides does not guarantee that your DON will come in below the 2ppm dockage threshold. Below you will see a familiar table -- the 10 year averages of 100 FHB tests conducted over an 11 year period. DON is what really matters with FHB. Levels exceeding 2ppm will be docked or downgraded to feed and level over 10 ppm can be rejected. Rejection is a rare occurrence, but it can occur.

The majority of FHB outbreaks are mild to moderate, meaning that DON levels will be well under the 10ppm “rejection” threshold. There will be situations (perhaps 20% of the time) that for some reason or another a field has exceptionally high DON, for example 30 ppm or above. In these cases the best case fungicide scenario would not reduce DON to a satisfactory level.

If you have serious concerns about FHB, you need to use an integrated management approach, and that starts with using a moderately resistant variety. One issue that has been brought to my attention is that scab ratings are often not available until September. We will work on this at a regional level to provide you with data gathered from variety trials and scab nurseries over the past 5 years to provide you with better guidelines for variety choices. Read my other article in this week’s WCU for information on how this resistance works and what to expect. The use of a good, moderately resistant variety and a scab fungicide can reduce DON by roughly 75%. This integrated approach will put you in a much more favorable position if you end up in a situation where DON levels exceed acceptable levels.
Things are starting to warm up, and there is a chance that rain is coming our way next week. Some fields ready to break boot may enter flowering around this period.

**Table 1.** Results of 100 Fusarium Head Blight uniform fungicide trials conducted in 14 states over a 10 year period.

<table>
<thead>
<tr>
<th>Product</th>
<th>Severity</th>
<th>DON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosaro</td>
<td>52%</td>
<td>42%</td>
</tr>
<tr>
<td>Caramba</td>
<td>50%</td>
<td>45%</td>
</tr>
<tr>
<td>Proline</td>
<td>48%</td>
<td>42%</td>
</tr>
<tr>
<td>Folicur</td>
<td>40%</td>
<td>23%</td>
</tr>
<tr>
<td>Tilt</td>
<td>32%</td>
<td>12%</td>
</tr>
</tbody>
</table>


**Announcements**

**DSU High Tunnel Workshop & Field Day**
Thursday, May 29, 2014   10:00 a.m. - 3:00 p.m.
Delaware State University
Smyrna Outreach Center
884 Smyrna-Leipsic Road
Smyrna, DE

Delaware State University will be having a High Tunnel Workshop and Field Day. The featured speaker will be Dr. Lewis W. Jett, who is the State Extension Vegetables and small fruit Crops Specialist, West Virginia University and a leading expert in high tunnels and season extension.

**Talk Topics:**
• Scheduling takeover crops (2nd warm season crop)
• Growing into the fall: what works and what doesn’t
• Heat management in the high tunnel
• IPM in High tunnels
• High tunnel production economics

Attendees will earn 1 Delaware pesticide recertification credit.

*For more information, to register for this free workshop (lunch included), or for assistance due to disabilities contact: Dr. Rose Ogutu at rowutu@desu.edu or 302-857-6397.*

*or Jason Challades at jchallandes@desu.edu or 302-388-2241*

Registration is open until May 22, 2014.

**Christmas Tree Workshop**
Wednesday, May 14, 2014   4:00 – 6:00 p.m.
Spence’s Christmas Tree Farm
19 Ruyter Drive
Frederica, DE 19946
(Take Rt 113 to Barratt’s Chapel Rd. to McGinnis Pond Rd.)

Learn about arthropods and disease problems of Christmas trees using hands-on observation of plants and specimens.

Instructors: Nancy Gregory and Brian Kunkel

Cost: $15

Credits: 1 Pesticide Re-certification Credit., 1 CNP (Certified Nursery Professional) Continue Education Credit

*To register call (302) 730-4000 or email carolm@udel.edu.*


**Small Fruit Educational Meeting and Tour**
Thursday, July 10, 2014   5:00-8:00 p.m.
University of Delaware
Carvel Research & Education Center
16483 County Seat Highway
Georgetown, DE 19947

This meeting will highlight our extension IPM program addressing Spotted Wing Drosophila
monitoring and management in small fruits as well as ongoing variety testing and other research with blueberries, blackberries and grapes.

• Tour the blueberry variety trial, mulch and soil amendment experiments.

• See and sample berries from the blueberry variety trial.

• Tour the primocane fruiting blackberry trial and sample berries from the trial.

• Tour the wine and table grape trial.

Dinner will be provided.

Please pre-register before July 3 by contacting Karen Adams at (302) 856-7303 or adams@udel.edu.

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Weather Summary
Carvel Research and Education Center Georgetown, DE

Week of May 1 to May 7, 2014

Readings Taken from Midnight to Midnight

Rainfall:
0.11 inch: May 1

Air Temperature:
Highs ranged from 73°F on May 1 to 59°F on May 4.
Lows ranged from 56°F on May 1 to 44°F on May 5.

Soil Temperature:
57.6°F average

Additional Delaware weather data is available at http://www.deos.udel.edu/monthly_retrieval.html and http://www.rec.udel.edu/TopLevel/Weather.htm

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

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